THE

VICTORIAN NATURALIST

THE JOURNAL AND MAGAZINE

OF THE

Field Naturalists' Club of Victoria

VOL. XLIII

MAY, 1926, TO APRIL, 1927

Hon. Editor: CHARLES BARRETT

The Author of each Article is responsible for the facts and opinions recorded

---

MELBOURNE:
HORTICULTURAL PRESS PTY. LTD., BANK HOUSE, BANK PLACE
1927

PAGE

SANCTUARIES AND RESERVATIONS—
  Sperm Whale Head 1, 61, 161, 311
  Sherbrooke Gully 129
  Dandenong State Forest 193, 250
Thrips, Australian 188

PAGE

Thrips, Notes on 330, 360
Vertebrata, Extinct, From Beaumaris 78
Wasps, Two Mallee 202
Wisewould, Frank 272
Xiphocaris compressa 332
Yan Yean, Around the . . 184
Zoology, Marine 5

ERRATA:

Page 2, line 6—For "*aurantica*" read "*aurantiaca*."
Page 40, line 5—For "(*oxylobium*) *elipticum*" read "(*Oxylobium*) *ellipticum*."
Page 41, line 8 from bottom—For "*Novæ Zealandiæ*" read "*novæ-zelandiæ*."
Page 46, line 1—For "*subulata*" read "*subulatus*."
Page 53, line 11 from bottom—For "*Dulicina*" read "*D. ulicina*."
Page 54, line 6—For "*Xerotes*" read "*Lomandra*," and at page 56, line 22.
Page 55, line 12—For "*Astroloma*" read "*Acrotriche*."
Page 55, line 20—For "*exertus*" read "*exsertus*."
Page 56, line 3—For "*Bredemeyra*" read "*Bredemeyera*."
Page 68, line 11 from bottom—For "*Thryptoccene Mitchelliana*" read "*Thryptomene calycina*."
Page 77, line 4 from bottom—For "*Menzesii*" read "*Menziesii*."
Page 90, lines 4 and 7—For "*fluviatilis*" read "*fluviatile*."
Page 121, line 13—For "*vaccinacea*" read "*vacciniacea*."
Page 123, line 5—For "*Platycerus*" read "*Platycercus*."
Page 123, line 25—For "*macronryncha*" read "*macrorrhyncha*."
Page 130, line 17 from bottom—For "*ciliatus* Stapf." read "*calycina*, Lindl."
Page 133, line 21—For "*latifolia*" read "*lotifolia*."
Page 133, line 26—For "*Calyptorhyncus*" read "*Calyptorhynchus*."
Page 137, line 28—For "*Spiculoea*" read "*Spiculæa*."
Page 144, No. 13, on Plate, "*Burnettia cuneata* Lindl."
Page 162, line 13—For "*rosemarinifolia*" read "*rosmarinifolia*."
Page 162, line 15—For "*Chorozema*" read "*Chorizema*," and line 2 from bottom.
Page 162, line 2 from bottom—For "*Mitchelliana*" read "*calycina*."
Page 218, line 5 from bottom—For "*diversifolium*" read "*populneus*."
Page 219, line 24—For "*lopantha*" read "*lophantha*."
Page 230, line 17—For "*Chiloclottis*" read "*Chiloglottis*."
Page 237, line 5 from bottom—For "*vilossa*" read "*villosa*."
Page 238, line 21—For "*Anigosanthes*" read *Anigosanthos*."
Page 239, line 16—For "*Ricinocarpos*" read "*Ricinocarpus*."
Page 254, line 5 from bottom—For "Pallied" read "Pallid."
Page 263, line 10—For "*ericifolia*" read "*squarrosa*."
Page 265, line 5 from bottom—For "*Crytostylis*" read "*Cyrtostylis*."
Page 298, line 20—For "*sepia*" read "*sepium*."

The Victorian Naturalist

VOL. XLIII—No. 1 MAY 7, 1926 No. 509

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall, Victoria Street, on Monday evening, April 12, 1926. The President, Mr. Geo. Coghill, occupied the chair, and about fifty members and friends were present.

REPORTS.

Reports on excursions were given as follows:—Zoological Gardens, Mr. F. Pitcher; Observatory, Mr. C. Oke; Botanic Gardens, Mr. F. P. Morris; Hopkins River, Mr. V. Miller.

Mr. Pitcher moved that a letter of thanks be sent to Mr. A. Wilkie, the Director, for his kindness and attention to the party which visited the Zoological Gardens. Seconded by Mr. C. Daley, and carried. Mr. Oke moved that a letter of thanks be sent to Mr. Merfield for his kindness in devoting an evening, and the attention he had paid to members visiting the Observatory. Seconded by Mr. Harvey, and carried.

ELECTION.

On a ballot being taken, Miss Joan Harper, "Noojee," Avalon Road, Armadale, and Mr. T. Greaves, c/o Mrs. Hallett, Park Road, Cheltenham, were elected as ordinary members, and Mr. C. J. Daniels, 602 Kiewa Street, Albury, N.S.W., as a country member of the Club.

PAPER.

"Sperm Whale Head as a Sanctuary," by A. D. Hardy. The author gave a general description of Sperm Whale Head, and urged the desirability of having it reserved as a National Park for Eastern Gippsland. He showed a number of lantern slides depicting various shrubs and trees, also the different types of country and vegetation met with on the "Head" and adjacent parts.

At conclusion of his paper, Mr. Hardy moved that—

> "In the opinion of the Field Naturalists' Club of Victoria, such Crown lands of Sperm Whale Head Peninsula, in the Gippsland Lakes, as are situated north-east of S. E. Barton's Allotment 21, Parish of Boole Poole, should be reserved as a National Park, and proclaimed as a sanctuary for native animals."

The motion was seconded by Mr. Williamson and carried unanimously. Several members, including the President, Messrs. H. B. Williamson, C. Daley, C. Barrett, and F. Pitcher spoke in support of the project, and it was decided to appoint a sub-committee to further it. The following were elected:—Messrs. A. D. Hardy, F. G. A. Barnard, C. Barrett, C. Daley, A. E. Keep, C. Oke, and H. B. Williamson.

EXHIBITS.

By Miss E. Cameron: Osage, *Maclura aurantiaca* (North America), from Buchan, Gippsland.

Mr. C. Daley, B.A., F.L.S.: *Acacia discolor*, the Sunshine Wattle, from Nowa Nowa; also scoriaceous stones from crater at Tower Hill, Victoria.

By Mr. E. Hanks: Nests of the following birds from Wandin, Victoria:—Yellow Robin, Dusky Wood Swallow, Grey Fantail, Brown Flycatcher, Yellow-faced Honeyeater, and Goldfinch.

By Mr. A. E. Rodda: Head and neck of Brown Snake, *Diemenia textilis*, from You Yangs, November, 1925.

By Mr. J. Searle: Aquatic larvæ. a—larva of *Ceratopogon* sp. (one of the midges); b—beetle larva with long branchial processes.

By Mr. A. L. Scott: Microscope fitted with a Bertrand's quartered quartz plate for measuring extinction angles of minerals in thin section.

Note.—The use of this device is to attain a greater accuracy than can be obtained ordinarily in determining the position of crossed nicols, and also in measuring extinction angles of minerals in thin sections. If this ocular be placed between analyser and polariser, and one of these latter slowly rotated, the quadrants in the eyepiece will change colour. At certain positions the colours can be matched, and the position of exact matching is the position of crossed or parallel nicols as the case may be. In measuring an extinction angle, the mineral is placed so as to appear lying across one parallel to the other of the dividing lines of the quadrants which have been previously calibrated to the nicol axes. The position of the stage is noted, and the stage rotated until the colours of the sections of the mineral in the two quadrants match. The stage position is again read, and the difference of the reading gives an extinction angle.

By Mr. T. G. Sloane: Specimens showing the state of the foliage of nine-tenths of the red gum trees, *E. rostrata*, along the banks of the Murray River at Mulwala in March, 1926. Collected 4/4/26 by T. G. Sloane. Also *Callistemon paludosus* (Swamp Bottle-brush) on which *Loranthus pendulus*, the Drooping Mistletoe, was growing.

EXCURSION TO WARRNAMBOOL.

Eight members of the Club mustered for the excursion to the Hopkins River. On the railway journey to Warrnambool on April 2 the extremely dry nature of the season was evident in the absence of verdure, the Western District having as yet received very little rain. In several parts of the Otway Forest volumes of smoke showed that bush fires were still a menace. The grass is not yet springing on the rich volcanic soil, which everywhere shows striking evidence of bygone volcanic activity in which Mounts Moriac, Elephant, Noorat, Rouse, Leura, and other vents took such a prominent part.

On arrival at Warrnambool the party proceeded to Mrs. Proudfoot's, at the boat-sheds, a resort favourably situated about two miles out on the Hopkins River, and well known to anglers throughout the State.

The Hopkins is an example of a drowned river valley, and for about six miles up-stream is a fine river, sometimes hundreds of yards in width. Like most coastal streams, its mouth is barred with sand. The river is frequented by fish, especially bream and mullet. Excursions were made by boat to the mouth of the river, where, in the cliffs, some old kitchen middens were examined, and on the other side of the entrance along the beach specimens of seaweed were gathered at the request of Mr. Lucas, of Sydney.

Two pleasant trips were made by motor-boat up the river, on each side of which, for about five miles, rise steep, broken, honey-combed cliffs, very scantily vegetated near the stream, the hills on each side being bare and treeless except for an occasional Casuarina. The composition of these hills is the prevailing, widespread, dune sandstone, bedded and consolidated with a "top-dressing" of volcanic soil varying in depth. Draping the cliffs here and there are graceful mats of *Mesembryanthemum*, whilst a few Casuarinas, Boobyalas, stunted Acacias and the Kangaroo Apple maintain a precarious footing.

The comparatively treeless nature of the soil covering the dune sandstone or limestone is a characteristic of these Western District plains. There is, strange to say, a striking absence even of Eucalypts, only a few stunted specimens being seen. Sheoaks grow well about five miles up the river. The trees which, from their spreading roots seem best adapted for growth, are various species of pine, especially the Araucaria or Norfolk Island pine, which flourishes well in and around Warrnambool.

Jubilee Park, about six miles up the river, is well planted with pines, which, with the native Casuarinas, give shade and shelter on the Camping-ground. Above this the river becomes shallower, and, beyond tidal influence, an intrusion of basalt in the stream, makes progress up-stream more difficult for boats. Water-birds were numerous on the wide stretches of the river. About two hundred or more swans frequented the shallows about a quarter of a mile in front of the boatsheds, while seagulls, cormorants, black duck, teal, coots, and other birds were seen from time to time, and white-fronted herons, as lone fishermen, were frequently observed along the banks. About 30 species of birds were listed.

A visit was paid to the local Museum, which has a good, if somewhat incongruous, collection of specimens. There is a fine and characteristic collection of stone axes and implements, showing how, in the absence of better material, basalt was extensively used by the south-western tribes of Victoria, especially for the grooved axe-heads. An interesting slab of sandstone from one of the quarries, showing the two impressions like footmarks and other supposed evidence of man's presence, is on view. This exhibit, when discovered, was the subject of much discussion as to its genuine nature, and as evidence of the antiquity of man in Australia.

The chief excursion was that on Easter Monday, to Tower Hill, on approaching which may be seen the rich land resulting from its outpourings when in action ages ago. In the road cuttings are stratified layers of volcanic ash, forming the rock surface just beneath the over-burden of soil. We ascended the highest part of the extensive volcanic basin—a conical hill 323 feet in height. This remarkable crater is about two miles in diameter, and at one time contained an expanse of water, now much reduced. A fine view is obtained from the Hill, which appears to have been the central focus of eruption, among many other vents within the whole area. A hard, volcanic plug from which erosion has taken place evidently gives the Hill its conical shape. Right on the summit, within the space of a few yards, quite a collection of insects was made—moths, beetles, flies, slaters, etc., also spiders, being found.

A few hundred yards away was a crater of perfect shape probably more than 100 feet deep, its steep sides being loose, scoriaceous material, lava and ash. Some of the party descended to the bottom, which was caked with black mud, on which grew various plants, including the thistle, the common bulrush, various grasses, the stinging nettle, etc. On one side was a clump of Boobyala, and half way up the cindery slope was a solitary Casuarina. The extensive crater so fruitful in producing the wonderfully rich soil of the surrounding district, was probably the most recent of the volcanoes which poured their lava flow over so wide an area in western Victoria.

Opportunity was taken to visit the rough, disintegrating cliffs at Thunder Point and Shelly Beach, and also the Breakwater, the protective mass of masonry at the entrance to Warrnambool Bay, in which, some years ago, a sudsidence, with fractures in the huge wall, occurred. A visit was also made to the Cemetery, where, in the twisted, fractured, or inclined positions of some of the monuments and tombstones, may be seen the result of an earth tremor or movement recorded a couple of years ago, and evidently focusing in the area on which the Cemetery is placed.

A return to Melbourne was made on Tuesday, after an enjoyable outing.—C. Daley, V. Miller.

MARINE ZOOLOGY.

Despite the forecast of stormy weather, a party of naturalists assembled on Port Melbourne Town Pier on Saturday morning, April 24, for a dredging excursion. The sky was grey-clouded and a slight mist was over the Bay. The wind, boisterous during the night, had dropped to a light breeze that carried our craft at about five or six knots an hour across the Bay towards Altona. After rounding the black buoy that marks the end of the reef, and heading for Point Cook, we cast the dredge for a trial haul. The bottom proved rough in patches, and our first couple of casts did little more than "hop-scotch" over the stony bed and gather up a few molluscs and a fine collection of stones, from egg size to one weighing several pounds, and almost filling the mouth of the dredge.

We soon got away from this formation, and then the dredge brought up a plentiful supply of weed filled with all kinds of marine life. Crested Weed-fish, *Cresticeps*, of brilliant hues and marvellous shapes; Leatherjackets, an inch or two in length, with a formidable-looking dorsal spine, the remnant of the dorsal fin, from which it takes its generic name, *Monocanthus;* Parrot-fish, with varied coloured stripes; "Cobblers," the local name for the Fortesque, so dreaded by fishermen for the possession of spines at the side of the head, which can be erected at will, and inflict a most painful wound; and a single specimen of the curious little Sea-dragon, *Pegusus draconis*, were among the numerous fishes brought up by the dredge.

Long, narrow, green Isopods, resembling the Zostera among which they live, nimble amphipods, Mysis-like shrimps, curious little snapping shrimps, and larger prawns were found among the smaller crustacea. There were crabs of all shapes and sizes, quaint creatures with long swimming legs, flattened at the ends, like oars, attached to a triangular carapace about half an inch across and scarcely more than one-sixteenth in thickness; short-legged, nut-shaped crabs, almost covered with a sponge, or a colony of ascidians, larger Spider-crabs, with a complete covering of algæ of many kinds on their carapaces and limbs, that formed a cunning disguise, either for protection from foes or to enable the crabs to stalk their prey.

At intervals between the weed-beds would be banks of dead shells and sand, from which the dredge invariably brought up numbers of the small Heart urchin, an echinus resembling the fossil casts of *Lovinia*, so common at Beaumaris. In other weed-beds were found the little Sea Horse. *Hippocampus*, and its near relative, the Pipe Fish, *Syngnathus*. Growing on many of the seaweeds were numerous colonies of Hydroids, such as *Plumularia obliqua*, *Campanularia*, and others; and Polyzoa, *Crisia tensus*, etc. Worms were frequently brought up—Terebellidæ, Nemertine, Neries, Polychæts and *Polynœ*, with its curious coat of mail. Starfish were many and various; beautiful Feather stars were numerous. These crinoids can swim fairly rapidly, and are then objects of grace and beauty, the five biramous arms alternately beating in unison; flat, hard, biscuit-like stars; the common dark-coloured, leathery stars; large 8-10 rayed stars, ten or twelve inches in diameter, were numerous. Brittle stars were less plentiful. Echini, other than the Heart urchin, were seldom brought up; the largest noted was a red-coloured one, about 2½ inches across, with numerous very thin spines.

Later in the afternoon the wind freshened and there were strong indications that the forecast might eventually be fulfilled, so our bows were turned homewards, and Port Melbourne was reached at 6 p.m. (just as the rain commenced). Here the party separated, each laden with bottles containing ample material for study at home. It is a pity dredging excursions are not more frequently arranged. The work is intensely interesting, if at times arduous, and the amount of material collected is marvellous. A great deal of work remains to be done, and it is work that our Club should undertake. If the Bay was marked out in sections, and each thoroughly worked over, and the collections handed to specialists for identification and description, we would soon have a good knowledge of what our Bay contains, while our Museum would be enriched by a good collection of local specimens.—J. SEARLE.

VICTORIAN CHITONS

By Edwin Ashby, F.L.S., M.B.O.U., Etc.

The study of Chitons should appeal to Australians, and especially to those who reside in Victoria, for the following reasons:—

(1) As Dr. S. S. Berry, the well-known American conchologist, stated in a letter to me some years ago, "The metropolis of the Chiton world is to be found either in Australia or the western coasts of North and South America." It seems almost certain that Australia holds the first place; but this can only be determined when a great deal more effective work has been done around our coasts.

(2) Although the records from Victoria do not equal those from South Australia, and barely those of New South Wales, it should have representatives of the fauna of each of those States within its boundaries. New South Wales has a fauna peculiar to a warm equatorial current, which impinges on the Australian coast a little north of Brisbane, and flows southwards down the coast of New South Wales; and probably the influence of this ocean current extends to a point a little below Mallacoota, from which locality Mr. Charles Barrett has recently brought specimens of *Ischnochiton (Haploplax) lentiginosus*, Sow., a familiar N.S.W. species, which is decorated all over with blue spots.

Then, the western part of Victoria is washed by the great, cold current that flows from the west along the southern coast of Australia, the main stream turning a little southward down the western coast of Tasmania. The late Mr. Dillon, of Portland, has added several species to the known fauna of Victoria that were heretofore considered peculiar to the adjoining State of South Australia.

Ecology

Some knowledge of the conditions favourable to Chiton life will be necessary before one can become a successful collector or student. Most species are littorine, living in comparatively shallow water, and can, therefore, be reached at low tide. They adhere to rocks, which, by preference, must be smooth on some parts of their surface; limestone or sandstone, unless the grain is very fine, is not favourable; those rocks which have some flat surfaces, are piled one on the other and are not too large to turn over, will prove to be the best hunting ground. Slate (mudstone) rocks for this reason have the highest record, and next to them come some of the igneous rocks and hard, close-grained sandstone.

One group, the *Stenochitons*, lives on sea-grasses, those marine plants that are so often called seaweed (algæ): although they produce flowers and fruits. This group of plants covers miles of the shallow waters around the Australian coasts and inlets. All the five known species of *Stenochiton* are found in South Australia, but of these only two have, up to the present, been recorded from Victoria. It is almost certain that at least two others will ultimately be found in that State. Only one of the five is a deep-water form, *S. pallens*, Ashby; the single example from Victorian waters was dredged by Bracebridge Wilson, near Port Phillip Heads, many years ago. *S. longicymba*, Blainville, retires during the daytime into the brown sheaths at the base of the stems of Ribbon-weed, *Posidonia australis*, and the almost transparent form, *S. posidonialis*, Ashby, just above the brown, half-buried sheaths; the little hump-backed species, *S. cymodocialis*, Ashby, is found on the cylindrical stems of the other common sea-grass, *Cymodocea antarctica*.

ROCK FORMS

The best-known chiton is the great *Plaxiphora albida*, Blain. This is found in Port Phillip on large exposed rocks, but will also be seen on rocks facing the open sea; with their strong armour and well-protected girdles, these chitons are able to dare the surf of the breakers. The girdle is covered with bristles, and the whole animal, more often than not, with seaweed. The sculpture varies from perfectly smooth specimens to shells covered with coarse wrinkling, with one or two diagonal ribs. For years I have been collecting specimens of *Plaxiphora* from all round the Australian coasts, and I believe that every stage of intermediate form still exists, from one extreme to the other, and I am, therefore, inclined to consider them as varieties of one species, *P. albida*, Blain.

The extremely sculptured form, *conspersa*, Angas, the two smooth forms, *tasmanica* and *bednalli*, both of Thiele, all are varieties of *albida*. But, until an exhaustive examination has been made of the complete series, collectors must please themselves as to whether they recognise these as good species, or as mere varients of one very variable species. It will help much towards reaching a true solution of the problem if collectors will endeavour to obtain a good series from as many localities as possible.

Perhaps the handsomest species of Australian chitons, excepting those whose beauty is revealed by a pocket-lens, belong to the sub-genus *Rhyssoplax*, which forms a section of the genus *Chiton*, s.s. Of the members of this genus the one most often met with in Victorian waters is *R. jugosus*, Gld., a very deeply-keeled shell, reaching over 1½ inches in length, and handsomely sculptured with coloured longitudinal ribs. In the western part of the State another charming form, *R. tricostalis*, Pils., is found, in which the longitudinal ribbing is less conspicuous, but it has three to four very coarse, nodulose lateral ribs; the shell varies in colour into many shades of brown, red, and yellow Both these species prefer rocks in deep, clean pools; rocks upon the upper side of which brown seaweed grows—the chitons will be found on the sides of the rocks.

Most chitons will not face rough water, for the rolling over of the stones by the sea waves crushes them; therefore it is only those forms that have exceptionally strongly-built shells, and strong girdle attachment, that can face these odds. Those that are not so strongly furnished perforce have to choose sheltered waters, or take refuge under the lower rocks of a pile, or on the under-sides of rocks embedded in a sandy bottom.

In Port Phillip, at Mornington, and elsewhere, a little tufted-chiton, *Acanthochiton retrojectus*, Pilsbry, is common on the stones that are almost covered at half tide. At the same tide level, on the under-sides of stones resting on a sandy bottom, will be found in numbers two species of thin-shelled chitons, *Ischnochiton lineolatus*, Bl., and the smoother form of *I. atkinsoni*, called *lincolnensis*. Representatives of both these species vary in colour from black to white, and through a variety of shades of reds, greens, etc., their colour pattern is quite as variable. *Lineolatus* has the scales of the girdle much larger than those of the other species.

In water a little deeper, that is, in shallow pools at lowest spring-tide, under the bottom rock, a large black chiton, *Ischnoradsia evanida*, Sowerby, occurs. The largest I have is 3½ inches in length. They are very numerous at San Remo, but wherever smooth, sheltered rocks exist round the Victorian coast the species should be met with.

The little *Kopionella matthewsi*, Ire., looking outwardly like a small *Plaxiphora*, has recently been found at Mornington by a girl just 11 years of age. This chiton, when examined under a pocket-lens, is found to possess, in addition to two rather ordinary forms of girdle bristles, a third kind of glassy, slender bristle, surmounted by a white swollen head, shaped much like a paddle blade. This peculiar feature was discovered by the writer some years ago, and suggested the name of the genus, *Kopionella*=a little oar.

The tail valve of this species is turned up much as in the genus *Lorica*. The *Kopionella* is to be searched for in pools at low tide, and will more often be found on the sides of the rocks than underneath them.

Two specimens of *Kopionella* were collected this January at Mornington by Dorothy Green, a member of the Mornington Naturalists' Club, which is doing good work under the guidance of the Rev. George Cox. With the exception of a specimen in the collection of Mr. C. Gabriel, which came from Portland, this is the first record for the State.

In similar situations will be found, in Victorian waters, a highly-sculptured chiton called *Callistochiton meridionalis*, Ashby. The pleural area is a beautifully executed network, and the lateral areas are furnished with two large nodulose ribs. The two handsome chitons, *Calliozona* and *exoplunda*, the former green, the latter pink, both have to be searched for in deep pools below lowest tide mark, and on rocks partly bedded in coarse, clean sand. The green and ivory species, *bednalli*, was dredged by Bracebridge Wilson, near Port Phillip Heads, and seems to frequent pools too deep for the wader to reach.

It will be gathered that, from half-tide down to 3 feet below lowest low-water mark each foot or two of level will have its particular species of chitons, and Professor Harvey Johnston used the Queensland chitons to distinguish the various zones at which other forms of marine life are to be found. While some forms of *Acanthochitons* (chitons with tufts of bristles at the sutures) are to be found in large numbers in sheltered shallow water, there is another group of the same genus that occurs only below lowest tide-mark, and then rarely. The three Victorian species, *A. wilsoni*, Sykes, *A. pilsbryi*, Sykes, and *A. gatliffi*, Ashby, all belong to this group, and are only found in the situation mentioned above, or dredged.

At least many forms as yet unrecorded from Victoria will be found, with the addition of some that are quite new to science, if a new race of earnest workers can be stimulated into action. These intending students must be prepared to don old clothes and work up to the middle at lowest tides. An iron bar, or hook, will greatly help in the turning over of the larger rocks. It means work, but, at least during the summer months, the experience is a delightful one and within the reach of all.

Structure and Other Characters.

Before dealing with the evolution of chitons, some brief explanation seems needed as to the life history and the characters of the animals and their shells. In common with the *Gastropoda*, they are stomach-footed, have a separate head, which is furnished with a tongue (radula) armed with numbers of hook-like teeth, by means of which the animal rasps off food. The body is furnished with gills, placed along the sides in varying positions according to the genus.

The juvenile chiton is free-swimming, but very early commences to form its coat-of-mail shell, composed of eight separate parts (valves), which are beautifully hinged together and tied, on their outer margin, to the leathery girdle. The girdle, in most forms, is capable of great expansion and is variously protected and ornamented with glass-like scales of great beauty, glassy bristles in varied forms and chalky spines blunt or otherwise.

The ornamentation of the shell has been aptly termed "sculpture." While the designs are extremely varied and often intricate in detail, they always conform, in some measure, to a common plan, made up of three areas: a V-shape dorsal area, a V-shape pleural area, and an inverted V-shape lateral area.

The character of the sculptural ornamentation of the shell, and that of the girdle clothing, except when supported by other less superficial differences, are considered by authorities as specific characters only. The most important generic distinctions are to be found in the changes in the "insertion plate," which is an outward growth of the inner layer of shell, forming a sort of "fang," to which the girdle is attached — in the position and numbers of the gills, and in the dentition of the radula. These are supplemented, in a few genera, with alterations in the shell and girdle, which correspond with special structural features in the animal.

The colour schemes have practically no specific value, varying, as they do, in a single species from white to black, through pink, red, yellow, orange, green, and blue, with a wide variation in pattern, mostly made up of geometric designs bilaterally uniform.

Evolution of Chitons.

Chitons are found in the Palæozoic rocks of the Northern Hemisphere, and occur in these primary rocks in quite an advanced stage of development, as regards sculpture and form; but in all the known primitive genera, the insertion plate is absent, whereas in all living forms, with the exception of the Lepidopleuridæ, the insertion plate is present.

The absence of this feature means that the girdle is easily detached by the rolling over of the rocks, to which the creature is adhering, by the waves, and serious, if not fatal, injury done to the animal.

The more strongly the girdle is attached to the shell, by so much is the degree of risk to the animal lessened; thus, in the development of the insertion plate, we have a most important survival factor, and in the ingenious devices adopted to this end, we can read, as in a book, the history of the evolution of chitons throughout the ages of the past. I am aware that Iredale and Hull, in a recent publication, have suggested that the absence of the insertion plate in living members of the Family Lepidopleuridæ, is due to degeneration, but, as this hypothesis is unsupported, as regards the genus *Lepidopleurus*, by any important factor, is seems to confuse classification.

Two, if not three, species of *Lepidopleurus* live in the shallow waters of Victoria: a little cream-coloured shell about half-an-inch in length; a smaller one, with blood-red body and very fragile, highly ornamented shell; and a still smaller species, with coarser sculpture than the last. These are called, respectively, *liratus, matthewsianus*, and *badius*. They live underneath the bottom rocks and stones, where one or more are piled on top of each other; it is undoubtedly this habit of secreting themselves in such protected situations that has enabled members of the *Lepidopleuridæ* to survive down the ages, in spite of their imperfect girdle attachment.

In Australian waters several other members of this genus exist, but all are deep-water species, only obtained by dredging, their survival being accounted for from the fact that the depths at which they live are undisturbed by the storms which are a serious menace to littorine forms.

Then, as we follow up the scale of development, starting with the genus *Lepidopleurus*, whose members have no insertion plate, we have, in the Northern Hemisphere, *Hanleya*, with the insertion plate in the anterior valve only; an Antarctic genus, *Hemiarthrum*, with insertion plate in the two end valves only; then forms with insertion plates in all valves, but no slits. None belonging to this stage of development, however, have yet been found in Australian waters. The genus *Choriplax*, which is represented by two species, *grayi*, Ad. and Ang., from Sydney (one example only), and *C. pattisoni*, Ashby, from South Australia (one example). This genus has no slits in its insertion plate, and was thought by earlier writers to belong to the *Lepidopleuridæ;* but I have shown, in an earlier paper, that its true place is much higher up in the genetic-tree — that it really has highly developed insertion plate in which the slits have been suppressed, owing probably to the peculiar environment in which it lives.

The next stage is one in which there are insertion plates in all valves, and these plates are deeply slit, thus enabling the muscles to tie the shell to the girdle more strongly. The Ischnochitons, of which a number of species can easily be obtained round the Victorian coast, well illustrate this stage of chiton evolution.

Then we have in the true *Chitons*, which in Australia are known under the sub-generic name *Rhyssoplax*, in addition to the slits in the insertion which divide it into what are technically known as "teeth" (although serving a very different purpose), a fine serration of the edges of the teeth is present, which still further increases the strength of the attachment of the girdle. In another genus, represented in Victoria by *Callistochiton meridionalis*, Ashby, the sides of the slits are "festooned"—curved outwards; in *Callochiton* represented in Victoria by three species, the "teeth" are fluted.

All these changes, we believe, have been brought about to strengthen the attachment of the girdle. Chitons possessing these improvements are able to venture out of the protection of sheltered holes, and the undersides of more or less buried rocks, into much more exposed positions, and some forms even into the rough and tumble of the ocean surf on the rocks exposed to the full force of the waves.

It is by means of these "survival factors" that the "expectation of life" of chitons has been increased, and they have been enabled to venture into feeding grounds which are still closed pastures to the more primitive forms.

LOCALITY LIST OF VICTORIAN CHITONS.

Class **AMPHINEURA.**

Order **Polyplacophora.**

Family **LEPIDOPLEURIDÆ**, Pilsbry.

Genus **Lepidopleurus**, Risso.

Lepidopleurus liratus, Ad. and Ang. Port Phillip Heads, Ocean Beach, Phillip Island (G. and G.).

badius, Hed. and Hull. Torquay and Portland (G. and G.).

profundus (Ashby M.S.), May. Dredged Port Phillip Heads (J.B.W.).

columnarius, Hed and May. Dredged Endeavour, Bass Strait.

*Family **PROTOCHITONIDÆ**, Ashby (Fossil only)

Sub-order Chitonina, Thiele.

Family ACANTHOCHITONIDÆ, Hedley.

Sub-family AFOSSOCHITONINÆ, Ashby (Fossil only)

Sub-family ACANTHOCHITONINÆ, Ashby.

Genus Acanthochiton, Gray, em.

Acanthochiton sueuri, Blainville, syn. *asbestoides*, Smith. Wilson's Prom., Kershaw.

granostriatus, Pilsbry. Black Rock, Sandringham, Port Phillip, Portsea, Torquay, Portland.

bednalli, Pilsbry. Port Phillip Heads (J.B.W.)

pilsbryi, Sykes. Western Port, Shoreham (G. and G.). Port Phillip Heads (J.B.W.).

kimberi, Torr. Torquay, Portsea and Portland (G. and G.).

retrojectus, Pilsbry. Coasts generally.

variabilis, Ad. and Ang. Mornington, Torquay, Portland, and Shoreham (G. and G.).

gatliffi, Ashby. Port Phillip Heads (J.B.W.). Point Cook, Port Phillip (G. and G.), dredged.

Genus Notoplax, H. Adams.

Notoplax wilsoni, Sykes. Port Phillip Heads (J.B.W.).

glyptus, Sykes. Port Phillip Heads (J.B.W.). Portsea; Western Port; off cable, Bass Strait (G. and G.).

matthewsi, Bed. and Pils. Port Phillip Heads (J.B.W.).

speciosus, H. Ad. Westernport; Portland; off Piles, Portsea Pier (G. and G.). Port Phillip Heads (J.B.W.).

Sub-family CRYPTOPLACINÆ, Thiele.

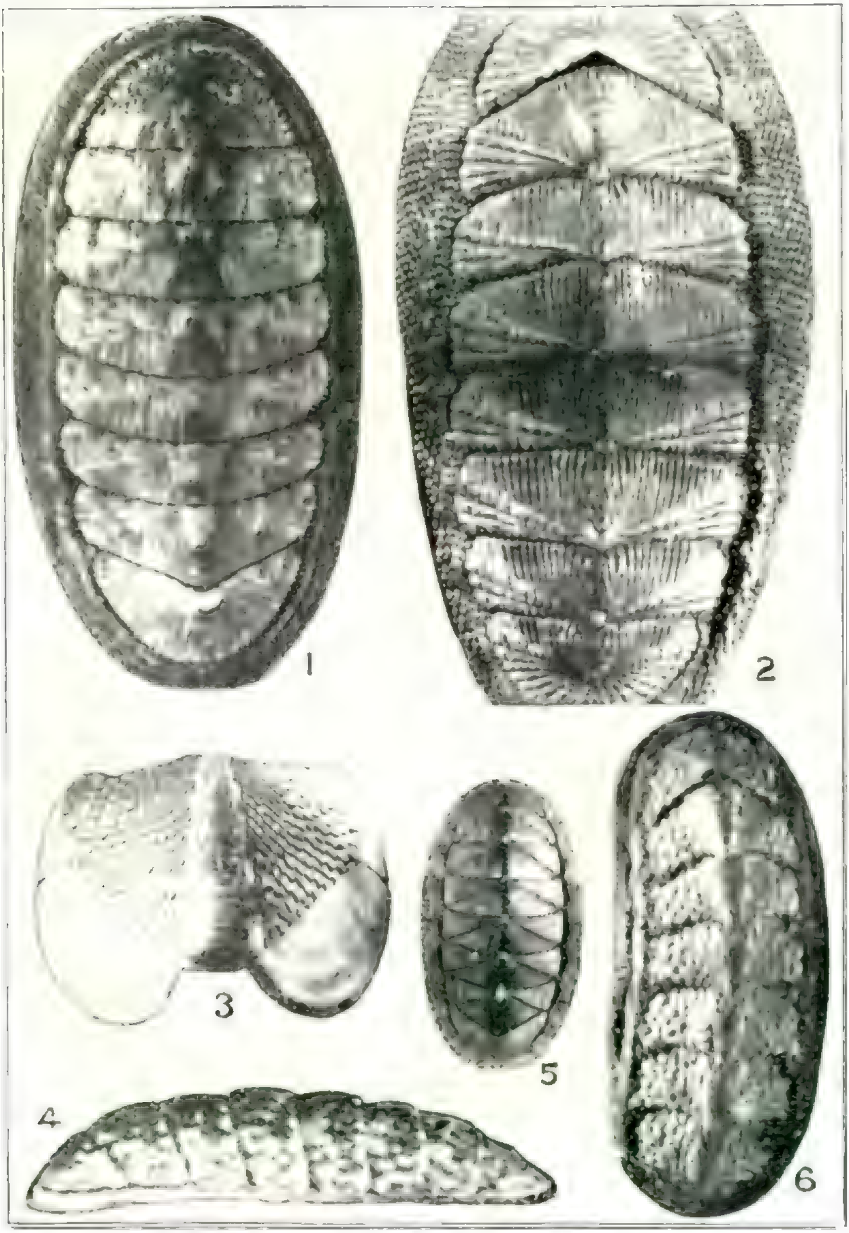
Genus Crytoplax, Blainville.

Cryptoplax striatus, Lamarck. Port Phillip, Western Port (G. and G.).

---

*Pilsbry places the *Ischnochitonidæ* and the *Mopaliidæ* earlier than the *Acanthochitonidæ* in the order named, but Thiele considered that Family more primitive than the *Ischnochitonidæ*. Owing to the additional light thrown upon this group by the examination of examples of the fossil genus *Protochiton*, I placed the Family *Protochitonidæ* immediately above the *Lepidopleuridæ*, considering that these forms were the progenitors of the *Acanthochitonidæ*, expressing it as my opinion that this latter family was never derived from the *Lepidopleuridæ*, but from an even more primitive stock along parallel lines, and await the confirmation of this surmise by the discovery of intermediate fossil forms.

PLATE I



PHOTOS, E. ASHBY

Fig. 1 *Ischnochiton pallens* (enlarged). Fig. 2 *Chiton* (*Rhyssoplax*) *vauclusensis*. Fig. 3—Median valve of holotype of *Notoplax stewartiana* (enlarged). Fig. 4—*Stenochiton cymodocialis*. Fig. 5—*Chiton* (*Rhyssoplax*) *rugosus*, var. *diaphora*. Fig. 6 Holotype of *Notoplax* (*Amblyplax*) *rubiginosus*.

iredalei, Ashby (previously recorded under name of *gunni*, Rv., which is a Tasmanian var. of *striatus*), Flinders, Western Port, Torquay (G. and G.).

Family **CALLOCHITONIDÆ**, Thiele.

Sub-family **CALLOCHITONINÆ**, Thiele.

Genus **Callochiton**, Gray.

Callochiton platessa, Gould, Portland (G. and G.).
rufus, Ashby, Port Phillip Heads (J.B.W.).
mayi, Torr. Portland (G. and G.).

†Family **MOPALIIDÆ**, Pilsbry.

Genus **Plaxiphora**, Gray.

Plaxiphora albida, Blainville, syn. costata, Blv., smooth var., var tasmanica, Thiele, syn. bednalli. All coasts.

Genus **Kopionella**, Ashby.

Kopionella matthewsi, Ire. Portland (Gabriel Coll.), Mornington (D. Green).

Family **ISCHNOCHITONIDÆ**, Pilsbry.

Genus **Ischnochiton**, Gray.

Ischnochiton torri, Ire and May. Port Phillip Heads (J.B.W.).
lineolatus, Blainville = *crispus* auct. All coasts.
atkinsoni, Ire. and May, var. *lincolnensis*, Ashby. All coasts.
falcatus, Hull. Port Phillip Heads (J.B.W.). Western Port, Ocean Beach, Phillip Island (G. and G.).
wilsoni, Sykes, syn. *laevis*, Torr. Port Phillip Heads (J.B.W.).
proteus, Rv. Coasts, generally.
proteus, var *milligani*. Ocean Beach, Point Nepean, Shoreham, San Remo (G. and G.).
contractus, Rv., syn. *decussatus*, Rv. Portland (G. and G.).
pallens, Rv., non *contractus*, Rv., syn. *iredalei*, Dupuis. Portland (G. and G.).
virgatus, Reeve. Coasts generally.
gabrieli, Hull, Western Port.

Sub-genus **Stenochiton**, Ad. and Ang.

Stenochiton cymodocialis, Ashby. Portland and Lorne (G. and G.).
pallens, Ashby. Port Phillip Heads (J.B.W.).

Sub-genus **Haploplax**, Pilsbry.

Haploplax pura, Sykes. Port Phillip Heads (J.B.W., G. and G.).

---

†I have followed Thiele in placing the *Mopaliidæ* before the *Ischnochitonidæ*.

smaragdinus, Angas. Sub-species *resplendens*, Bed. and Mat. Port Fairy, San Remo, Torquay, Portland (G. and G.).

lentiginosus, Sowerby, Mallacoota. C. Barrett. First record.

thomasi, Bednall. Torquay. Portland (G. and G.).

Sub-genus **Heterozona**, Carpenter.

Heterozona cariosus (Carp.M.S.), Pilsbry. Port Phillip Heads (J.B.W.). Flinders; Western Port. Port Fairy, Portland (G. and G.).

subviridis, Ire. and May. All coasts.

Genus **Callistochiton**, Carpenter.

Callistochiton meridionalis, Ashby. Portland.

Family **CHITONIDÆ**, Pilsbry.

Sub-family **CHITONINÆ**, Pilsbry.

Genus **Chiton**, Lin.

Sub-genus **Rhyssoplax**, Thiele.

Rhyssoplax jugosus, Gould, var. *diaphora*, Ire. and May. Torquay, Port Fairy, Portland (G. and G.).

calliozona, Pilsbry. Back Beach Phillip Island, Portland (G. and G.).

exoptanda, Bednall, dgd. near Newhaven, Phillip Island, off cable Bass Strait (G. and G.).

bednalli, Pilsbry. Port Phillip Heads (J.B.W.). Off cable, Bass Strait (G. and G.).

tricostalis, Pilsbry. Port Phillip Heads (J.B.W.). Port Fairy, Portland (G. and G.).

Sub-family **LIOLOPHURINÆ**, Pilsbry.

Genus **Lorica**, H. and A. Adams.

Lorica cimolia, Reeve. Back Beach, Williamstown (P. and G.).

Genus **Loricella**, Pilsbry.

Loricella torri, Ashby. Dredged off Rhyll, 5 fms. Western Port (G. and G.).

MEMO.—My warm acknowledgments are due to Messrs. Gatliff and Gabriel for checking the above list and supplying additional localities. J.B.W. refers to Rev. J. Bracebridge Wilson collection. G. and G. mean that the localities attached are those given in papers by Messrs. Gatliff and Gabriel, or that one or other of them has specimens from that locality in their collection. P. and G.=Pritchard and Gatliff. *Ischnochiton ptychius*, Pils., has not been included because the single record was probably a misidentification of *I. falcatus*, and also I have shown, in an earlier paper, that Sykes record of *I. tateanus*, Bed., was due to a similar misidentification.

SOME ADDITIONAL MICROZOA FROM THE RED LIMESTONE AT GRANGE BURN, VIC.

By WALTER J. PARK

(*Read before the Field Naturalists' Club of Victoria, March 5, 1926*)

In volume XXXII of the *Victorian Naturalist*[1] Mr. F. Chapman gave a list of the smaller fossils he had obtained from a sample of weathered limestone, collected opposite Mr. Henty's homestead, on the Grange Burn, near Hamilton. The evidence thus provided gave support to his view already expressed in Memoir No. 5 of the National Museum,[2] Melbourne, that this limestone occupied an intermediate position between the Balcombian and the Kalimnan, and was on the Batesfordian horizon of the Janjukian.

Recently, by the kindness of Mr. Chapman, I was enabled to examine other material he had collected at the same time from the Grange Burn limestone. As the foraminifera and ostracoda found, link the microscopic fauna of the upper portion of the Lower Beds at Clifton Bank with that already described from the Grange Burn limestone, it has seemed desirable that a list of them should be recorded. Advantage has also been taken of the opportunity of comparing the foraminifera of both deposits with those of the Janjukian limestone of Batesford.

In appearance, my sample was similar to that dealt with by Mr. Chapman. It was a decomposed polyzoal limestone of a warm-brown colour, but was much richer in foraminifera and ostracoda, the former including a number of species of *Miliolidæ*, a family which was not represented in Mr. Chapman's list. Probably the sample came from a less calcareous stratum of the limestone, as the *Miliolidæ* were not of the type usually found in our polyzoal limestones.

Including those recorded by Mr. Chapman, which are prefixed thus (*), the subjoined list records the occurrence of 58 species and varieties of foraminifera, and four of ostracoda. Nearly all of these are known from the Batesford limestone, but, with the exception of *Calcarina defrancii*, *Gypsina howchini*, *Amphistegina lessonii*, the *Lepidocyclinæ*, and *Cytheropteron batesfordiense*, are not specially characteristic of this Janjukian horizon.

---

[1] Pp. 144-146. Figure in text

[2] 1914, p. 47.

Species which are elsewhere unknown from the older series—the Balcombian—but in this area occur in the Grange Burn limestone, as well as in the brown marl at Clifton Bank, are:—_Pentellina angularis_, _Bolivina hentyana_, _Spirillina tuberculata_, _Cytheropteron batesfordiense_, as well as several species of _Lepidocyclina_.

The brown marl at Clifton Bank also seems to show some relationship with the Batesford limestone, as both contain several species of foraminifera which, as far as our knowledge goes, are confined in our Tertiaries to these two deposits and others on the Batesfordian horizon. They are:—_Verneuilina ensiformis_, _V. decorata_, _Chrysalidina costata_, _Pavonina flabelliformis_, _Discorbina cruciformis_, _Planorbulina plana_, _Truncatulina echinata_, var. _lævigata_, _Pulvinulina scabra_, var. _umbilicata_, _Calcarina defrancii_, _Polytrema minutum_, and _Lepidocyclina tournoueri_, _L. martini_ and _L. verbeeki_. I have not met with _Gypsina howchini_ in the brown marl; possibly as I have not had an opportunity of examining any of the coarser material from these beds.

The species found are:—

FORAMINIFERA.—_Biloculina bradyi_, Schl.; _Biloculina ringens_, Lam. sp.; _Biloculina depressa_, d'Orb.; _Biloculina irregularis_, d'Orb.; _Miliolina oblonga_, Mont. sp.; _Miliolina seminulum_, Linné sp.; _Miliolina vulgaris_, d'Orb. sp.; _Miliolina cuvieriana_, d'Orb. sp.; _Miliolina trigonula_, Lam. sp.; _Miliolina tricarinata_, d'Orb. sp.; _Miliolina schreiberiana_, d'Orb. sp.; _Miliolina agglutinans_, d'Orb. sp.; _Pentellina angularis_, Howchin sp.; _Sigmoilina schlumbergeri_, Silv.; _Sigmoilina sigmoidea_, Brady, sp.; _Haplophragmium sphæroidiniforme_, Brady; _Textularia abbreviata_, d'Orb.; _Textularia rugosa_, Reuss sp.; _Textularia sagittula_, Defr.; _Textularia siphonifera_, Brady; _Gaudryina rugosa_, d'Orb.; *_Bolivina heutyana_, Chapman; _Cassidulina subglobosa_, Brady; _Lagena semistriata_, Will.; _Nodosaria_ (_D._) _soluta_, Rss. sp.; *_Nodosaria_ (_D._) _obliqua_, L. sp.; *_Marginulina costata_, Batch, sp.; _Cristellaria rotulata_, Lam. sp.; _Polymorphina gibba_, d'Orb.; *_Polymorphina elegantissima_, P. and J.; *_Polymorphina regina_, P. and J.; _Uvigerina tenuistriata_, Rss.; *_Sagrina raphanus_, P. and J.; _Globigerina inflata_, d'Orb.; _Spirillina tuberculata_, Brady; _Discorbina rosacea_, d'Orb. sp.; *_Truncatulina refulgens_, Montf. sp.; *_Truncatulina ungeriana_, d'Orb. sp.; _Truncatulina haidingeri_, d'Orb. sp.; _Anomalina glabrata_, Cushman; *_Pulvinulina elegans_, d'Orb. sp.; _Pulvinulina repanda_, F. and M. sp.; *_Rotalia calcar_, d'Orb. sp.; _Rotalia clathrata_, Brady; _Calcarina defrancii_, d'Orb.; _Gypsina globulus_, Rss. sp.; *_Gypsina howchini_, Chapman; _Polystomella macella_, F. and M. sp.; _Polystomella_ _crispa_, L. sp.; _Polystomella craticulata_, F. and M. sp.; *_Amphistegina lessonii_, d'Orb.; *_Operculina complanata_, Defr. sp.; *_Operculina complanata_, var. _granulosa_, _Leymerie_; *_Lepidocyclina marginata_, Mich. sp.; *_Lepidocyclina tournoueri_, Lem. and Douv.; *_Lepidocyclina martini_, Schl.; _Lepidocyclina sumatrensis_, Brady sp.; _Lepidocyclina verbeeki_, Burrows and Holland

OSTRACODA.—*_Bairdia amygdaloides_, G.S.B.; *_Cythere postdeclivis_, Chapman.; _Cytheropteron batesfordiense_, Chapman; _Cytherella pulchra_, G.S.B.

NOTES ON THE MORE INTERESTING SPECIES.

FORAMINIFERA.

PENTELLINA ANGULARIS, Howchin sp.

Miliolina angularis, Howchin, 1889. Trans. Roy. Soc. S. Aust., vol. xii, p. 2, pl. i, figs. 1-3.

Pentellina angularis, Howchin, 1915, Idem, vol. xxxix, pp. 348, 351.

With the exception of specimens described by Halkyard from the Blue Marl (Eocene) of Biarritz, under the name of *Pentellina attenuata*,[3] but considered by Heron-Allen and Earland to belong to this species, *P. angularis* has only twice previously been recorded, in both cases by Professor Howchin. His records were from the Lower Beds of Muddy Creek, and from a boring on the Lilydale Sheep-station, S. Australia, where it was associated with *Pulvinulina scabricula*, elsewhere a Janjukian species.

The figure shows the usual appearance of examples of this species. The outer walls of the later chambers have, in most cases, wholly or in part disappeared as the result of weathering, leaving the septa dividing the chambers remaining as longitudinal ridges.

ANOMALINA GLABRATA, Cushman.

Anomalina glabrata, Cushman, 1924, Publ. 342, Carnegie Institute of Washington, p. 39, pl. xii, figs. 5-7.

This species has only recently been described by Dr. Cushman, from Samoa, where it is found at depths ranging from 17 to 50 fathoms. It is not uncommon in our Balcombian and Janjukian strata, and also occurs in the Kalimnan. I have found occasional specimens in dredgings from the famous "Challenger" station, off Raine Islet, Torres Strait, where so many of the species found fossil in our Tertiaries occur in the living condition.

---

[3] Mem. Proc. Manchester Lit. and Phil. Soc., vol. lxii for 1917, 1919. No. 6, p. 15, pl. viii, figs. 1, 2.

A. glabrata is subject to some variation in the height of the test. Figures 3 and 4 are drawn from one of the stouter examples.

Lepidocyclina sumatrensis, Brady sp.

Orbitoides sumatrensis, Brady, 1875, Geol. Mag., dec. 2, vol. ii, p. 536, pl. xiv, figs. 3*a-c*.

O. (*Lepidocyclina*) *sumatrensis*, Brady, Newton and Holland, 1899, Ann. and Mag. Nat. Hist., series 7, vol. iii, p. 259, pl. x, figs. 7-12.

Two specimens have been found which I have referred to this species. They correspond with Brady's fig. 3*a*, and Newton and Holland's fig. 8, which was prepared from a photograph of the example figured by Brady. They also agree with their description of the external characters of this species, *i.e.*, have a sub-globular test, with the rough surface which is found in weathered specimens, and the median edge is produced to form an irregular narrow keel. With the exception of describing the surface as being rough and granular, neither Brady nor Newton and Holland mention the number of comparatively large papillæ which occupy the centre of each face of the test, although fig. 8 of the latter authors shows them very clearly.

In my determination I am supported by Mr. Chapman, whom I take this opportunity of thanking for the assistance he has so frequently and for so long given me.

L. sumatrensis has not previously been recorded from Australian fossil deposits. It is usually found in strata of Burdigalian age. Previous records have been from Sumatra, Java, Borneo and elsewhere. There appears to be some doubt as to whether the species usually recorded under this name from the European Tertiaries is really *L. sumatrensis*, as Lemoine and Douvillé note that the European form never shows evidence of pustules or granules.[4]

OSTRACODA.

Cytheropteron batesfordiense, Chapman.

Cytheropteron batesfordiense, Chapman, 1910, Proc. Roy. Soc. Vict., vol. xxii (n.s.), pt. ii, p. 300, pl. ii, figs. 7*a-c*. Idem, 1914, vol. xxvii (n.s.), pt. i, p. 45, pl. viii, fig. 36.

The records of this ostracod are, with one doubtful exception from the Kaliman, confined to Janjukian strata. Typical specimens occur in the Grange Burn limestone, and in brown marl (Lower Beds) at Clifton Bank. I have not met with it in the Balcombian deposits of Port Phillip.

---

[4] Mem. Soc. Geol., France, Palaeontologie, vol. xii, fasc. ii, 1904, p. 18, pl. I, fig. 14; pl. II, fig. 15; pl. II, fig. 6.

VICTORIAN FERNS

By H. B. WILLIAMSON, F.L.S.

PART V.

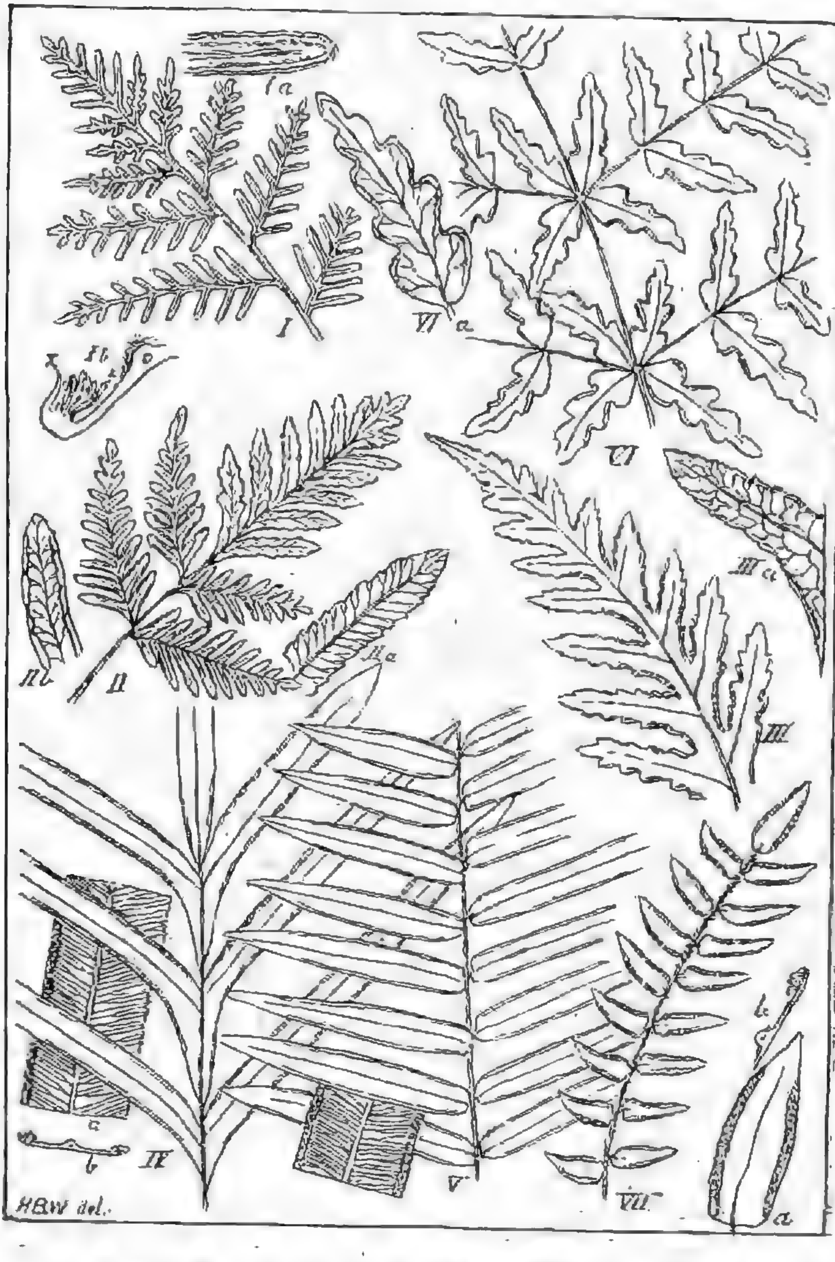
All the seven species dealt with here are described in Bentham's Fl. Aust. and in Mueller's Key as belonging to the genus Pteris, but, in Christensen's "Index Filicum," the recognised authority on the nomenclature of ferns, only four have been retained in Pteris, the rest being removed to other genera.

GENUS PTERIDIUM.

PTERIDIUM AQUILINUM (L.), Kuhn. Common Bracken (Fig. I, end of a pinna). This is perhaps the most widespread of the ferns, being found in every continent, and in Polynesia. The only part of Australia from which it has not been recorded is the Northern Territory. Hooker says "In Lapland it just passes within the Arctic Circle, ascending in Scotland to 2000 feet, in the Cameroons to 7000 feet, in Abyssinia to 9000 feet, and in the Himalayas to about 8000 feet." Dr. Spruce has seen it in the Andes 14 feet in height. The form growing in Australia is the variety known as *esculenta*, which occurs only in the Southern Hemisphere. Bentham notes that some specimens from Portland (Robertson) come very near to the typical form. Botanically, *Pteridium* is separated from *Pteris* by its having the pinnule margin thickened, and its sori between a marginal indusium opening inwards and a delicate inner indusium—shown in section in Fig. Ib (x, outer; z, inner indusium). Ia is an enlarged pinnule.

GENUS PTERIS.

PTERIS TREMULA, R.Br. Tender Bracken (Fig. II, end of a pinna) united by Mueller with the European *P. arguta*, Ait. The distribution is the same as that of the common bracken. The fronds are of a membranous nature, rising usually to 3 to 4 feet, and attaining a degree of firmness when fruiting. The pinnules are mostly opposite, and are more distinctly decurrent on the rachis than in *Pteridium*. The pinnules which show no sign of fruiting are distinctly toothed, and the simply-forked veins are easily seen. The indusium is formed by the incurved margin of the pinnule, and in the advanced stage is concealed by the expanded sori, which are almost continuous, and, unlike *Pteridium*, scarcely



I—PTERIDIUM. II, III, IV, V—PTERIS. VI—HISTOPTERIS.
VII—PELLAEA.

reach to the base of the pinnules. It has been found in all districts of Victoria except the North-west. Fig. IIa, a barren pinnue; IIb, a pinnule with sori.

PTERIS COMANS, Forst. Hairy Bracken (Fig. III). T., V., N.S.W., Q., Am., N.Z., P. This is a much rarer fern than *P. tremula*, and one easily confounded with that species until the venation is examined, when the difficulty at once ceases, since the veins are copiously reticulate (Fig. IIIa) The sori are usually continued round the sinus (space between teeth or lobes), but rarely to the tips of the lobes, and the pinnules are much more widely decurrent on the rachis than in *P. tremula*. The plant is quite devoid of hairs, and "Net-veined" or "Netted Bracken" is here suggested in place of the vernacular given in the Census. It has been found in the Dandenong Ranges, at Johanna River (west of Cape Otway), Lorne, and various parts of the Otway Ranges.

PTERIS UMBROSA, R.Br. Shade Brake-fern (Fig. IV). V., N.S.W., Q. This differs from *P. tremula* and *P. comans* in not having much-divided fronds. The fronds, from 2 to 3 feet, are pinnate, with 10 to 20 pinnæ about 7 inches long, and half an inch wide, usually broader and minutely serrate when barren. The pinnæ are broadly decurrent on the rachis and the veins are mostly forked, and very spreading from the midrib. Though extensively cultivated, it is rarely gathered wild in our State. It has been recorded from Genoa (Mueller), Orbost (E. E. Pescott), and Mt Drummer (A. J. Maher). (a, enlarged portion of a pinna showing one edge barren.)

PTERIS LONGIFOLIA, L. Long Sickle Fern (Fig. V). V., N.S.W., Q., and all continents. This fern also is rarely gathered in Victoria, the only authentic record being "Mitchell and Buchan Rivers, Gipps Land (F. Mueller)" Fl Aust., p. 730. The specimens from Buchan are the only Victorian ones in the National Herbarium. It differs from *P. umbrosa* in the pinnæ not being decurrent on the rachis, but attached to it by the stalk only. The fruiting is much the same as in *P. umbrosa*. The Buchan specimens are a small form with pinnæ only about 3 inches long, the whole frond being only about 9 inches long Fig IVb shows a section of a pinna of Pteris.

Genus HISTIOPTERIS.

HISTIOPTERIS INCISA (Thunb.) J Smith. Batswing Fern (Fig. VI.). N.Z. and all parts of Australia, except W.A. All continents except Europe. Widespread through Victoria, but does not occur in the North West. The fronds are large, up to 5 feet, twice or thrice pinnate, quite glabrous, with the under-surface often of a greyish blue. The pinnæ and pinnules are opposite, and the lowest pair of pinnules are sessile in the axils. The veins are repeatedly forked. The sori are continuous or interrupted, often neither reaching the base nor the apex of the segments.

Genus PELLÆA.

PELLÆA FALCATA (R.Br.), Feè. Sickle Fern. (Fig. VII.). T., V., N.S.W., Q., As., P. Fronds up to 8 inches long, with a stem beset with brown scaly hairs, simply pinnate. The pinnæ are somewhat falcate, truncate, or almost cordate at the base, attached as in *P. longifolia*, sometimes placed closer on the rachis than is shown in Fig. VII, pale green on the under-side, rather thick in texture so that the veins are obscure. Sori continuous all round, except at the base. It is found in all districts of Victoria, except the North West. It is a hardy fern, and is often seen in cultivation. The author has a plant which was growing at Pakenham in a rock crevice where very little soil existed. It has survived much neglect during about seven years. (a. an enlarged view of pinna; b, section of half of the same.)

CORRESPONDENCE

PRICES OF PINE TIMBER.

The Hon. Editor,
The Victorian Naturalist.

Dear Sir—

Referring to your December edition—article entitled "Excursion to Greendale"—I beg to inform you that during the period immediately following the war, *Pinus insignis* timber was in keen demand, and prices up to 14/- per 100 feet super in the round were obtained. At present the demand is not nearly so great, pines grown under forest conditions being worth up to 5/6 per 100 feet super in the round. Prices, of course, depend to a great extent on the situation of the timber, accessibility, etc. Present indications are that prices will appreciate in the course of time. Short knotty trees grown for shelter purposes are of little value for timber purposes.

Yours faithfully,
J. STRAHAN, Secretary.

NOTES ON THE GENUS CORYSANTHES

BY THE REV. H. M. R. RUPP, PATERSON, N.S.W.

This interesting genus of terrestrial orchids was supposed to comprise only about a dozen species, confined to Australasia. But, according to Dr. R. S. Rogers, nearly 50 species are now recognised, extending from the Himalayas in a south-east direction through the Malay Archipelago, New Guinea, and Australia, to the south of New Zealand. In eastern, extra-tropical Australia I have collected, or received, various forms included under one or other of the following species: *C. fimbriata*, R.Br.; *C. pruinosa*, R. Cunn.; *C. diemenica*, Lindl.; *C. undulata*, R. Cunn.; *C. unguiculata*, R.Br., and *C. aconitiflores*, Salisb. I venture to submit the following notes on these forms in the hope that they may stimulate other observers to assist in clearing up the confusion in which some of them appear to be involved.

We may clear the ground to some extent at once, by suggesting that no challenge can reasonably be offered to the specific rank of *C. undulata*, *C. unguiculata*, and *C. aconitiflores*. The first of these is, I believe, to be formally re-described by Dr. Rogers, and I will therefore not enter into details here with regard to its structure. It was briefly described, with other species, by Robert Cunningham, in 1833, but there is no subsequent record of it in the botanical world until June, 1923—a period of 90 years. The present writer then discovered, on the lower slopes of the Alum Mountain, Bulahdelah, N.S.W., a very small *Corysanthes*, which appeared to be quite distinct from the other known species. Through the investigations of Dr. Rogers, it was finally identified with the long-lost *C. undulata* of Cunningham. It is not uncommon in the locality mentioned. Cunningham's original description may be seen in the *N.S.W. Magazine* (No. 1), 1833, in the Sydney Public Library.

C. unguiculata is well figured by Fitzgerald in Vol. I, part 2, of his classical work. I have only collected it personally at Lindisfarne, Tasmania. Mr. W. H. Nicholls has sent me an admirable photograph of a "colony" growing near Cheltenham, Victoria. Fitzgerald records it in N.S.W., and Dr. Rogers describes it as a South Australian species, so its range is extensive, but it is comparatively rare.

C. aconitiflores is better known to botanists under Robert Brown's name of *C. bicalcarata*, but the rules of nomenclature have restored Salisbury's earlier name. Brown's name is less appropriate since the re-discovery of *C. undulata*, which is also bi-calcarate. This quaint orchid was common on the slopes of the Alum Mountain, at Bullahdelah. I have also found it at Paterson, N.S.W., and have received it from Tambourine Mountain, Queensland, and Eaglehawk Neck, Tasmania. Its range, therefore, is extensive. There are two distinct forms: one dull-purplish, the other—which is larger and earlier in season—white. The colouring and design of the interior surface of the "helmet" in the white form are exquisite. Miss H. Geissmann has forwarded a fine photograph of a colony of the typical form at Tambourine Mountain.

These three forms are distinguishable without any difficulty. It is otherwise with the three that remain—*C. fimbriata*, *C. pruinosa*, and *C. diemenica*. For the past five or six years I have been trying to satisfy myself as to the specific distinctions between these, and I have not succeeded, though I have formed the working hypothesis that they are probably varying forms of one species which are on their way to become three. Now, I am well aware that in some districts two of them, and in some all three, are so clearly distinct as to discredit this hypothesis. But we cannot argue in this case from the particular to the general. These forms —particularly *C. fimbriata* and *C. pruinosa* as I understand them—have a very wide range in Australia and Tasmania, and cannot be safely determined from one district; they are too variable.

At Low Head, in Northern Tasmania, in 1921, I collected three very distinct forms, which seemed to me to satisfy the requirements of these three species as described. There was *C. fimbriata* practically as we have it in Fitzgerald's Vol. I, Part I. There was *C. pruinosa* equally conforming to the figures on the same plate. And there was *C. diemenica* in agreement with the description in Rodway's *Flora of Tasmania.*

While I was in Tasmania I had little further doubt about *C. fimbriata*, for I never saw the Low Head form elsewhere. But I was soon in difficulties again with the other two; there appeared to be so many intermediate forms that I could not satisfactorily separate them. I may say here—and I believe that in this I am supported by a careful Victorian observer, Mrs. J. G. Coleman—that I cannot attach specific importance to the colour of the "helmet." It is a question of degree; it varies from translucent-greyish, with purple spots, to wholly dark purple. In Fitzgerald's form of *C. fimbriata* it is probably nearly always dark purple.

Upon returning to N.S.W. early in 1923 I found myself speedily involved in uncertainty between *C. fimbriata* and *C. pruinosa.* The form which I suppose to be *C. diemenica* is rather rare in N.S.W., at all events in the north. But though I cannot say that I have found the exact counterpart of the Low Head *C. fimbriata,* many forms are very close to it. In 1925 I received from Miss H. Geissmann, of Tambourine Mountain, Q., photographs and living specimens which seemed to correspond precisely with my Low Head form and with Fitzgerald.

A correspondence with Mr. W. H. Nicholls, of Footscray, Vic., revealed to me that what I was calling *C. pruinosa* was known to Victorian botanists as *C. fimbriata,* and what I took to be *C. diemenica* was their *C. pruinosa.* In the former determination they are apparently supported by Dr. Rogers' figure of *C. fimbriata* in his *South Australian Orchids.* With every respect for these authorities, I venture to submit that this forces the question, "What becomes of Fitzgerald's *C. fimbriata?*" It certainly exists, for I have collected it, and received it from Queensland. It is certainly not the same form as that which is now known in Victoria as *C. fimbriata.* Nor, I think, is the latter quite identical with Dr. Rogers' plant, for he describes it as having a crimson labellum, whereas in the Victorian form that segment appears to be mainly white. A crimson-purplish labellum is characteristic of my specimens from Low Head and Tambourine Mountain, as of Fitzgerald's figure; but Dr. Rogers' flower lacks the very long and striking fimbriæ of these others.

It appears to me that, if we eliminate the labellum for the moment, the differences in structure and habit between all these forms are not very great. I do not think they would be recorded as three distinct species on the ground of these differences. Now, with regard to the labellum, the distinctions are mainly those of contour. Colour is notoriously unsafe as a scoring-point for the determination of species. As to contour, we have two extremes—the very long expanding fringes of the form I have called *C. fimbriata* above, and the incurved, minutely denticulate margin of the form I have supposed to be *C. diemenica.* In between is the expanding form, acutely and prominently denticulate, which I have called *C. pruinosa.* Retaining these names—rightly or wrongly—for the moment, in Tasmania I found intermediates between *C. pruinosa* and *C. diemenica,* which strongly suggested that they were variants of one species. In New South Wales I find similar intermediates between *C. pruinosa* and *C. fimbriata.* I hesitate to propose any one of the three as the "parent," but as far as I am able to judge, the form I call *C. pruinosa* is the most widely distributed, though not in some districts the most abundant.

With some diffidence, therefore, and at present merely as a finger-post towards further investigation, I suggest that in *C. fimbriata* and *C. diemenica* we have variants (in opposite directions) from *C. pruinosa,* which are in process of evolution into distinct species. Perhaps they have actually reached their goal, since they do not seem to extend beyond these forms, but the continuance of so many intermediates renders it difficult as yet to definitely separate them from the medial type.

The length of this paper debars me from discussing the interesting habit of some Corysanthes of greatly elongating the stem after fertilization. I have only personally observed this in the form I have assumed to be *C. pruinosa,* and in *C. undulata.*

CORYSANTHES OR CORYBAS?

In plant nomenclature priority of naming is usually considered to govern the naming of plants. Thus the first name given to any plant is assumed to be its rightful name. Sometimes the rule is varied, especially if there be good reason for so doing.

In regard to the genus *Corysanthes,* this race of plants was first known as *Corybas,* having been so named by Salisbury. In the *Victorian Naturalist,* Vol. XL, No. 12, April, 1924, page 238, I drew attention to the fact that R. Schlecter, in a revision of the genus *Corysanthes,* in Fedde's "Repertorium Spicerum Novarum Regni Vegetablis," published in March, 1923, had placed all *Corysanthes* under the earlier name of *Corybas* on account of priority of naming.

If priority alone is to count, we must change the name of this genus which we have so long known as *Corysanthes.* Salisbury's name of *Corybas* was, however, very well known to Bentham when compiling the "Flora Australiensis." Over 50 years ago, Reichenbach, jr., had revived Salisbury's name, but Bentham refused to accept it on priority only, stating that the name Corybas was "universally rejected as having been surreptitiously figured and described." According to Bentham, Salisbury had access to a drawing by Bauer from R. Brown's specimens, and so described and named the plants.

So the question now is: Shall we adopt the first name, according to the law of priority, or retain the second and more familiar name—the name given fairly and squarely to the plant?—Ed. E. Pescott.

The Victorian Naturalist

Vol. XLIII—No. 2. JUNE 5, 1926. No. 510.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall, Victoria Street, on Monday evening, May 10, 1926. The President, Mr. Geo. Coghill, occupied the chair, and about 50 members and friends were present.

REPORTS.

Reports on excursions were given: Botany School, University, Mr. Blake; Macedon, Dr. C. S. Sutton and Mr. L. Hodgson; Black Rock, Mrs. E. Coleman.

ELECTION.

On a ballot being taken, Miss Embling, 258 High Street, Malvern, was elected as an ordinary member; Mr. J. D. Long, Union Bank, Stawell, as a country member; and Mr. W. Mitchell, Jun., Rivernook, Buffalo River, as an associate member of the club.

GENERAL.

The President extended a hearty welcome to Mr. and Mrs. Elliott, members of the Field Naturalists' Section of the Royal Society of South Australia. Mr. Elliott responded.

Mrs. E. Coleman read a proposal to form an Orchid Research Section, within the Club, having for its objects the collection of data and study of orchids. On the motion of Mr. E. E. Pescott, seconded by Dr. Sutton, the matter was referred to the Committee.

ELECTION OF AUDITORS.

Messrs. C. A. Lambert and H. Hughes were elected as Auditors for the year, on the motion of Messrs. C. Oke and H. B. Williamson.

OFFICE-BEARERS FOR 1926-27.

Nominations were made as follows:—

President—Mr. Geo. Coghill (proposed by Mr. F. G. A. Barnard, seconded by Mr. A. J. Tadgell); Mr. E. E. Pescott (Messrs. F. E. Wilson and D. Dickison).

Vice-Presidents—Mr. A. E. Keep (Dr. Sutton and Mr. Barnard); Mr. P. R. H. St. John (Messrs. Audas and Oke).

Hon. Treasurer—Mr. A. G. Hooke (Messrs. Oke and Williamson).

Hon. Librarian—Dr. C. S. Sutton (Messrs. Barnard and Oke).

Hon. Editor—Mr. C. Barrett (Dr. Sutton and Mr. Barnard).

Hon. Secretary—Mr. C. Oke (Messrs. Rodda and Audas); Mr. L. Hodgson (Messrs. Tadgell and Barnard).

Hon. Assistant Secretary and Librarian—Mr. H. B. Williamson (Messrs. Oke and Pescott).

Committee—Mr. J. W. Audas (Messrs. J. Wilcox and V. H. Miller), Mr. F. Chapman, A.L.S. (Messrs. D. Best and Barnard), Mr. C. Daley, B.A., F.L.S. (Messrs. Pescott and F. Pitcher), Mr. J. A. Kershaw (Messrs. Best and Barnard), Mr. V. Miller (Messrs. Williamson and Daley), Mr. A. E. Rodda (Mr. Pescott and Dr. Sutton).

PAPER.

By Mr. A. J. Tadgell: "Mount Fainter and Beyond." The author gave an account of a recent trip to a little-known portion of the Australian Alps, where interesting, rare and unrecorded plants were collected, as well as fossil remains of plant life at 5360 feet above sea level. The paper was discussed by Dr. H. Green and others.

EXHIBITS.

By Mrs. E. Coleman: *Pterostylis pedoglossa*, Fitz., and *Leptoceras fimbriatum*, Lindl., from Black Rock, 8/5/26.

By Mr. T. Greaves: Sea shells from New Guinea.

By Mr. V. Miller: Stone axe, found in St. Kilda.

By Mr. C. Oke: Frogghoper from Sugar-ants' nest, at Hattah.

By Mr. W. H. Nicholls: The Brittle Greenhood, *Pterostylis truncata*, Fitz., from Tottenham, Keilor Plains, a new district. Plants are very numerous at present, but are difficult to locate. These specimens differ from the You Yangs type, being much smaller of flower, and darker in colour.

By Messrs. A. J. Tadgell and A. G. Hooke, from Mount Fainter: Water-worn stones from old alluvial bed, a few feet under the summit of South Mount Fainter, 6,000 feet above sea level. Plants: *Agrostis Muelleri*, *Euphrasia antarctica*, and, to compare, *Euphrasia collina* (var. *alpina*), *Alchemilla vulgaris*, *Juncus falcatus*, *J. pusillus*, *Heleocharis multicaulis*, *Scirpus crassiusculus*, *Geranium sessiliflorum*, *Pratia puberula* (*Lobelia Benthamii*), *Carex stellulata* (*C. echinata*), *Muehlenbeckia axillaris*, *Callistemon Sieberi*, *Scleranthus mniarioides*, *S. biflorus*, *S. diander*, *Exocarpus nana*, *Astelia alpina*, *Nertera depressa* *Pentachondra pumila*, *Stackhousia pulvinaris*, *Aciphylla glacialis*. Specimens of fossil plant remains found

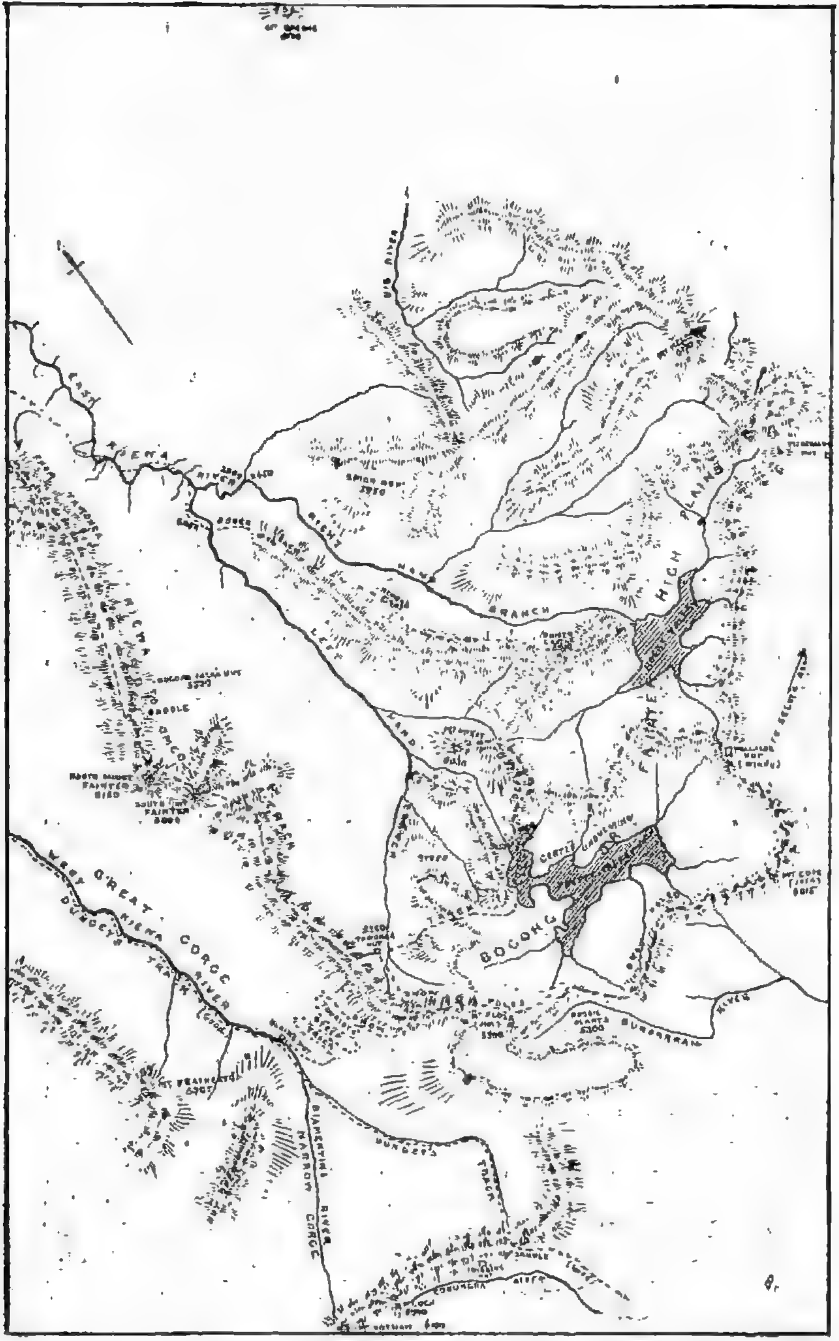
on the Bundarrah River, at 5,360 feet. From among the foliated clay Mr. F Chapman identified some nine different plant remains. There was also a specimen of coal from the same bed.

By Mr. A. L. Scott: Exhibit illustrating the nature of polarisation colours such as seen in thin sections of minerals and in oil films on wayside puddles. *Note*: On the stage of the miscroscope is a plate of quartz. If both nicols be in position, and one rotated, we observe a display of brilliant colours, yellows, blues, violets, purples. The quartz itself is colourless. The nicols are also colourless. The colours therefore arise from some change that takes place in the light itself on its way from its source to the observer's eye. If we examine the colours with a pocket spectroscope, also on the table, and rotate either nicol simultaneously, we will, if our adjustments are correct, see a dark band travelling from end to end of the spectrum as rotation proceeds. Any particular position of this band may be compared with any particular tint. The colours therefore arise through the absence from white light of certain constituents. In this particular case the absence arises from a property of quartz known as Rotary polarization. A brief explanation of this phenomenon may be found in Cross and Cole's "Modern Microscopy," p. 226, in the 1912 edition. For explanation as to how this absence is brought about in the cases of thin slices, reference may be made to Cross and Cole, as above, pp. 219 et seq.

By Mr. H. B. Williamson, F.L.S.: Flowering specimen of *Thryptomene Miqueliana*, F.v.M., the Dotted Heath-myrtle collected by Mr. F. Barton, Jun., at Sperm Whale Head; also young plants of same (distributed to members of the Club).

THE PRESIDENT'S HOSPITALITY.

The happy thought of the President and Mrs. Coghill to invite the members of the Club and friends to an informal gathering at their home, "Nariel," Monomeith Avenue, Canterbury, on Saturday evening, May 22, resulted in a representative gathering. Conversation and inspection of various objects of interest collected by the host and hostess in various parts of Australia, musical items and a lecturette by Mr. Frank Baker on the "Activities of the Ether of Space," made the time pass quickly. A hearty vote of thanks to Mr. and Mrs. Coghill was followed by the singing of "Auld Lang Syne."



MOUNT FAINTER AND SURROUNDING DISTRICTS.

Mount Fainter and Beyond

BY ALFRED J. TADGELL.

When on Mount Bogong, two years ago, Mr. A. G. Hooke and I planned the trip of February, 1926, to reach Mount Fainter and the Tawonga Hut beyond. Although the distance from Melbourne is only 135 miles, it is necessary to travel by rail to Bright, 200 miles, thence by motor car 24 miles, rising to 2000 feet at the Tawonga Gap and falling again to 1200 feet into the valley of the Kiewa; then continue on horseback for a further 20 miles. There is no regular conveyance between Bright and Tawonga. The road is good, and rises by tiers to the Gap, so that one appears at times to see three parallel roads and almost right-angled bends.

Although not far from "the haunts of man," we were pleasantly surprised to see a fine male Lyre Bird, *Menura superba*, race along the German Creek road, in front of our car, for nearly 100 yards before leaving to hide in the bush. Tawonga will not always be one of the outback places, for the Railways Standing Committee has just completed taking evidence with the view of constructing an iron road up the fertile valley, perhaps direct from Albury, on the main line, when glorious Alpine country will become more accessible.

Wake up, Victorians, to your Alpine beauty spots. Their charm lies in the fact that you get away from civilisation into the beyond. How many of you know of the infinite grandeur beyond the Buffalo Plateau, whose highest peak is 5645 feet? Unknown beauty spots are to be found in the Alps, which are thus briefly referred to in the "Year Book of Victoria:" "The highest mountain in Victoria is Mount Bogong, situated in the county of that name, 6509 feet above sea level; the next highest peaks are Mount Feathertop, 6306, Mount Nelson, 6170, Mount Fainter, 6160, Mount Hotham, 6100, Mount McKay, 6030, and Mount Cope, 6027; all in the same county," and comparatively close together, "while the Cobboras, 6030, are situated between the counties of Benambra and Tambo."

To reach the Tawonga graziers' hut, at 5550 feet above sea level, Mount Fainter is crossed by the Kiewa-Omeo surveyed track, and so is the well-watered "Little Plain" adjoining. The spurs are dry for 6 miles out of Tawonga, then the traveller will find water at convenient intervals, although he follows along the crest of the mountain ridges to Mount Fainter; afterwards, creeks and springs will be met with frequently. On the High Plains beyond Mount Fainter, in a normal season, there is abundance of water on either fall. The High Plains are known to stockmen as the Fainter High Plains, although marked Bogong High Plains on the maps. Mount Bogong is 15 miles from them, while Mount Fainter is about half that distance. There is reason, therefore, on the side of the stockmen, who range over these High Plains in summer and autumn, and know them well.

The Tawonga Hut (15 x 14 x 18 feet), distant 7 miles from Mount Fainter, is strongly built with an iron roof, and shelters under granite rock masses, showing wide bands of quartz. From this rock, overhanging the hut, there is a pleasing outlook over the creek valley, which will probably, in the near future, be made a reservoir by the Kiewa Hydro Electric Scheme, that primarily is a means of increasing the supply of electrical energy to the metropolis. Other graziers' huts, dispersed at not great intervals from the Tawonga Hut, are Blair's, 4½, miles distant; Dibbin's, 6; Wallace's, 6; Roper's, 9; Kelley's, 10; and Fitzgerald's hut, 14 miles. Let me, however, add a word of warning. Distance is largely a question of accessibility, rather than of measurement. Some of these huts may be found inconveniently placed, and somewhat difficult of access.

After leaving Tawonga, 1200 feet, we climbed up a dry watercourse, not too dry, however, for the fern *Dryopteris punctata* to hold its own in and around Mount Beauty, 2265 feet. Our attention was attracted to the bold outline of Mount Bogong, separated from us by about 7 miles of valley of the intervening East Kiewa. The play of light and shade caused innumerable spurs and valleys to stand out prominently, and many pleasant recollections were awakened of two visits and our climbs in and over those distant ridges (see *Vic. Nat.*, Vol. 41, Aug., 1924). What a panoramic picture we could have taken had we known that on our return, 10 days later, Mount Bogong would have been obscured by bush-fire smoke, of which as yet there was no hint. About 6 miles out of Tawonga there is water at the stock camping ground, and cool forest conditions become apparent.

A few flowers appeared and we saw Gang Gang cockatoos, *Callocephalus fimbriatus*, disturbed from feeding on the seeds of the Bitter Hop-Pea, *Daviesia latifolia*, of which they are very fond. Not content with the seeds, however, these birds had partially stripped the leaves from the bushes and left them underneath. This Hop-Pea is known as the basis of a patent medicine. It is useful to bushmen as a drench for worms in their horses; but they will not feed their stock upon it for any length of time, as hungry stock may suffer from its effects. Hickory Wattle, *Acacia penninervis,* appeared in the broad-leaved form, and the variety *falciformis,* whose large juvenile bipinnate leaves have more than once caused me to leave the track, to look at what I thought was a novelty. *Senecio dryadeus* (*Australis*) was prettily in flower down the slopes.

Bogong Jack's Hut, 12 miles from Tawonga, at 5330 feet, was reached in time for late lunch. Bogong Jack's identity has not been disclosed, but his exploits are still remembered and perpetuated by the name given to his former habitation, which, on being burned down, was replaced by the present substantial, shingle-roofed structure, built on a small flat portion of the range, that falls steeply away on the west side towards Bright, and again on the east side towards Mount McKay. Graziers have also erected hurdle yards for resting the cattle, in proximity to an easily-found spring, on the right-hand side. This has been so much tramped over lately that a bucket is difficult to fill, and the water is not so clear as elsewhere. At this spring, while filling the billy, our guide met an unwelcome companion and threw the contents over a copperhead snake which seemed loath to leave until thus politely requested. Of copperheads, *Denisonia superba,* we only saw one other specimen, and that near our hut at 5560 feet, but unfortunately we failed in our attempts to kill it. One wonders how these reptiles exist at such an altitude, but, as they hibernate during the cold and snowy weather, it is presumed "that Nature tempers the wind to the shorn lamb."

Mount Fainter was now a mile distant, and the travelling became very rough. From the sideling along which our track wound a splendid view was obtained north-west looking back down the West Keiwa valley and westward over the Ovens in the direction of Bright and Freeburgh. Our guide saw a fire starting near his home, and was caused some anxiety. Ten days later this fire was still burning fiercely, shrouding the Tawonga valley in a dense pall of smoke. At Bogong Jack's saddle, about midway between Bogong Jack's Hut and North Mount Fainter, the surveyors have brought the track over from the western to the eastern slope. Here some unpleasant climbing was experienced, but at each frequent halt a wonderful panorama excited admiration. As we stood there we felt it would be many a day yet before the mountain fastnesses would be disturbed by the noise of the motorist and the spirit of the mountains chased away.

It became necessary to dismount and give our horses as long a rein as possible. The footing was difficult for man and beast, even when walking up the large fixed, and nearly as large, loose stones on the ungraded track. "Steps of Stairs" this portion of the track has been called for a good half-mile, but the steps are irregular in height and size, and the stairs are "greasy," whether going up or coming down. We did not mind the time taken or the care necessary now, but it was just as well that the bush-fire did not catch us hereabouts on our return. In due course Mount Fainter was reached. Two peaks mark the summits. North Mount Fainter, at 6160 feet, and, about a mile distant, a little to the east, South Mount Fainter, 6000 feet. It is clear, says the late Mr. R. A. F. Murray, that the ranges forming the ancient watershed lines, of which Mounts Feathertop, Hotham, Cope and other mountains are probably remnants, were even of far greater elevation than they are now, and have been reduced by denudation hundreds, perhaps thousands of feet, during the time that the same action has taken to erode the deep valleys at their bases.

At the north end of the range, from what remains of the cairn on the highest point and just at the edge of the mount, there are glorious "glimpses of unstudied natural splendour." North of west 25 miles are the serrated Buffalo mountains, and, like clouds on the south-west horizon, the rugged Mounts Cobbler, Howitt and Buller. Four or five miles east are the pointed Mount McKay and the massive Mount Nelson; while beyond them, far away, are Mount Kosciusko and sister ranges. At our feet the awesome gorge of the Kiewa, some 3000 feet below, separated us from Mount Feathertop that we know so well (see *Vic. Nat.*, Vol. 38, Feb., 1922), here seen buttressed up by a long spur. Often we had gazed on Fainter's bold granite and basalt outlines, and had picked out with our glasses the two cairns, wondering, like many other people, what lay "on the other side of the hill."

To climb down the steep slope of Fainter and up the long Feathertop spur to the recently-erected chalet, two miles over the top, would, we considered, be not too difficult an undertaking. We knew something of these spurs, and had essayed Blair's hut from the other side in 1922; but when one climbs down these mountain slopes for more than a mile they are found to be disrupted and apparently interminable. Then the unknown holds one back, and, just where one would succeed, one fails in the final effort. We had climbed down the "hut" spur under the Razorback, and got close to the rocky bed of the Diamentina—but the unknown—so we returned on our tracks. Blair's hut can be reached from Feathertop, and so can the Tawonga Hut, under the High Plains.

This season was not a normal one, and, although no fires had so far reached up its slopes, Mount Fainter might not in fairness be judged from what we saw of it. The watercourses of the now dried-up springs had cut deeply into the mountain-sides, where Orites, Silver Daisy, Marsh Marigold and Cushion Carraway abounded. The pile carpet-like sward of *Poa caespitosa* gradually fell away for 160 feet till South Mount Fainter was reached. Here, marking the second summit, was the usual cairn and, like a playground of the gods, an elevated flat of some 30 feet x 15 feet, very evenly paved with basalt cobble-stones. As was our custom, we rebuilt the cairn. On this summit were mountain plants, such as the Snow, Coarse, and Fringed Daisies, white Hoary Sunray; the Snow Bent, and Bristle Grasses; the Alpine form of the Wallaby Grass; Knawel; dark, stout, ovoid-headed Woodrushes, so unlike the neat *Luzula campestris* of the lowlands.

Under the summit, some 15 feet, 20 years ago a party of miners had driven a tunnel on the alluvial bed, and, according to reports, had won good gold. The winter at 6000 feet is severe, as snow may fall at any time between the months of March and November; consequently, work was suspended till the following spring, and later abandoned, when, on attempting to resume operations, it was found that, for want of timber, the drive had fallen in. This alluvial is significant, as it points to the existence of an ancient river at a considerably relative higher elevation than the river-beds of the present day (Report V, Geo. Survey, Vic.). It was conjectured by the late Mr. Murray that a river ran south-east from Mount Fainter and connected with the fossil-bed formation on the Bundarrah River, 9 miles away: whereas the Kiewa, nowadays, runs almost due north. It is even thought that the river was the Dargo, which, in times past, might have had its course near Mount Fainter, instead of under Mount Hotham, 15 miles distant at the present time. Mr. F. Chapman has identified, among the water-worn stones I brought from the alluvial workings of Mount Fainter, lydite, quartzite, quartz-felsite, felspathic gneiss, and schist.

What is known to the stockmen as the Fainter Range runs for a mile long by 3 miles in width. Well down on either side are found rushing waters that swell one branch or other of the Kiewa, and might well constitute small independent rivers. Interesting plant life is found from 2-300 feet under the mount, and a marshy flat spreads out on the south side. In the sandy gravel are found dwarf epacrids, with the dark, chocolate-lined *Prasophyllum*, *exocarpus nana*, the Alpine-flowered and Rope-Rushes, and *Richea*, with long, creamy flowering spikes. Here, and also near the hut, we found plentifully the aster, *Olearia ramulosa*, var. *communis*, now merged in *O. floribunda* (Benth.). The stream that runs through this marsh was turned into an adjoining valley by old-time miners, and, over the rise a mile distant, the confused banks tell their own tale.

We had considerable difficulty in tracing the origin of the name given to Mount Fainter. Many, including local sources from which we had expected information, yielded no help; but, as usual, our guide knew his district. It would appear that, in the early days, there was a man "partial" to horses, who worked between Omeo and Tawonga, and, on one occasion to avoid an "interview," he was hard-pressed on foot, to get to his hut, on a flat near the top. He had nearly succeeded in reaching the summit, when he fell, exhausted; and, on coming round, he explained that the steep mountain side had put too great a strain on his heart. It is also fittingly added, that he and a mate lost their bearings in one of the fogs common to these altitudes, and separated, each going in the direction in which he thought the hut lay. The mate reached the hut, but the "hero" was never heard of again.

Hazlitt says that nicknames have governed the world and set in motion man's prejudices, doing their work more effectually than reason, besides getting through their job with the least time and trouble. Such were our thoughts as we reflected on the origin of the names Feathertop and Fainter. Feathertop's name might have originated from the feathery cloud that is sometimes seen over its summit, or from the feather-edge of the razor-back approach to its cairn. The latter is indeed, so apparent that, on my first attempt to get to its top, I decided to climb up a very steep side rather than take the direct track up its narrowing crest. What a name to bestow upon such a splendid mass of Nature's handiwork, a creation of countless miles of graceful spurs and buttresses, when Feathertop is viewed in the distance from the Bright-Harrietville road! Fainter, also—how inadequate and expressionless a name for majestic and rugged beauty! In both cases the prejudice of false impressions haunted the imagination, so that idea and association could not disconnect them.

Leaving the well-watered "Little Plain" at 5700 feet, and the grassy mustering-flat close to Mount Fainter, there are two tracks that lead to the Tawonga Hut and Fainter High Plains. One, open, though rocky and more suitable for the packhorse, continues along the rough surveyed track, passing "weeping rock" through a huge, rugged and sterile granite range—little short of 6000 feet—to the stock-yards, under "Nigger head," and the snow poles, when the hut may be seen. The newer deviation by which a mile and a half is saved, branches off at the creek, all upturned by the miners. A dilapidated building alone remains of the once-busy camp. While resting, we watched a fine fox lope along within easy range of a gun, and disappear into the bush again. Two beautiful streams were crossed, and the track, though good, was somewhat inconvenient from overhanging and fallen bushes. Snow Gums, *Grevillea victoriae*, and *Olearia flavescens* hold sway, and, along the granite-strewn track for nearly a mile, bushes of *Boronia algida* were met with for the first and only time, in company with the scaly *Phebalium squamulosum*. This was the only *Eriostemon* seen, excepting the leathery *Pleurandropsis trymalioides* collected on the Pretty Valley fall of the High Plains. The former species likes some little protection, while the latter prefers the exposed uplands, and this is seen in the adaptability of the forms of the leaves in both species.

Quite unexpectedly, the hut was reached on turning the corner of the track, close to an ideal mountain stream. At the hut there was a great commotion, and we counted 200 crows in one flock. This was the greatest number of these birds seen by us together, yet they did not appear to be hungry, as the carcase of a beast had lain untouched for a week outside the stockyard.

From the hut, at 5500 feet, we made several excursions down the rushing mountain stream, which becomes an affluent of the east branch of the Kiewa, and help that river on its journey of 85 miles. In its course over a rocky bed, sand and stones have worn many large, circular holes two feet deep. Robust bushes of stout, golden-headed *Callistemon Sieberi*, with elongated filaments and rich-coloured flowers of the Trigger Plant were seen, as well as pale, rose-coloured Austral Bluebells, unusual, I think, and somewhat a misnomer here. The very rare *Alchemilla vulgaris* lined the banks at frequent intervals, showing the "ladies' mantles" in yellowish-brown profusion; and in their company was the rare rush, *Heleocharis multicaulis*. A scale and a fungus were found, and have been kindly identified by Messrs. C. French, junr., and C. Brittlebank. That collected on *Callistachys* (*oxylobium*) *elipticum*, among the rocks in dry places, was the white mussel-scale (*Chionaspis Eugeniae*), with pretty, white, dispersed spore sacks, not unlike coral. The luxuriant *Brachycome decipiens*, overhanging the water's edge, with large flowers on a long scape, bore on its leaves and stems the æcidium of *Puccinia Brachycomes*. The latter was a clustered, cup-like fungus of pretty orange colour, with dusky membraneous edges. My own *Brachycome*, with toothed leaves, was very common, and quite at home in the mud of the rocks, as it was in the grassy depressions adjoining.

Among the rock crevices and on the banks, grew the rare *Juncus falcatus*, and the rarer *Carex echinatus*. The former has blackish inflorescence and black-tipped, grey-green, grass-like foliage. The *Carex* will now have to be added to the Club's Census. Fine specimens of the tea-tree *Leptospermum lanigerum*, worth all the effort to reach them, were growing 100 feet lower. We did not find any large waterfalls as expected. It is not an easy matter to climb for a mile up and down the bed of an alpine creek. We passed small waterfalls, cataracts and tempting Venus' baths as we went swinging from one side to the other, by means of perhaps the best specimens I have ever seen of the Mountain Plum Pine, *Podocarpus alpina*, with stems that measured 8 inches in diameter. This always reminds me of a dwarfed and spreading Japanese Pine, of pot culture.

Ferns were scarce, excepting the Alpine Blechnum. The Tunbridge Filmy Fern was met only once, on a cool rock-face, close to a waterfall. The small form of *Hypericum japonicum*, perhaps confined to the Alps, was abundantly in flower. It seemd an intenser green than the large form of the lowlands, and a water-lover, which does not characterise the var *graminea*. Sphagnum beds abounded, and, in them, odd-flowering specimens of the Veined Sun Orchid. Orchids were rare, owing perhaps to the season. The prasophylls, called by Dr. Rogers after the two male members of our Club, were the exception. The common Bird Orchid was difficult to locate, as it hid in the underscrub, as is its wont in these parts.

Less than a mile from the Tawonga Hut, on the hill-side leading up to the High Plains, there is, at 5800 feet, a curious basalt formation, which we termed "Our battery." Thirty or more columnar stone slabs, or logs, as the late Mr. Murray would have called them, are to be seen together. These stones are about as long as a house windowsill or stone step, and as truly shaped as if cut for some purpose with the chisel, and then abandoned. They are four, five, and even six-sided, and lie half embedded in the earth, looking in the distance like guns elevated into position ready to be fired. It needed little imagination to see gunlayers' work of a howitzer battery; each gun had a recoil jacket on top and below, while, to complete the illusion, the balls for charging the numerous guns lay around. These stones are uneven on their surfaces, and render the slope of the hill difficult of approach, as, in walking over them one needs to be careful of foothold, owing to the Mountain Plum Pine concealing the spaces between them.

Sometimes an unexpected pause, or an obstacle, will provide a prize for the natural history student. It was in this way that, hereabouts, we found a number of specimens of the rare *Geranium sessiliflorum*, just going out of flower. This plant is a good example of pilosism, as the leaves, in this exposed position, are thick and rough-hairy, while hydrotropism is seen in the long, thick, tap-roots, suggestive of difficulty in the search for moisture in such a season as the present one. Beyond "Our Battery" on the High Plains, about 2½ miles from the Tawonga Hut, a prominent feature on the landscape is Mount Flora, or "Jim," as the locals call it in contradistinction to "Jack," their name for Mount Cope, 2½ miles further to the south. Mount Jim rises to 5900 feet—the extreme height of the High Plains—and, at a distance, attracts attention because of the pleasing appearance given by its cover of Snow Gums, Hovea, and other shrubs. Masses of Hoary Daisy bushes and the Alpine Mint Bush, both a wealth of large, whitish-pale blue coloured flowers, created a veritable floral feast such as might well adorn a cultivated garden. These, with the Mountain Plum Pine, covered the lower rock formations, extending for many acres around. One marvels again whence come these untold square or several-sided blocks of basalt, in such shapely sizes. A closer examination of Mount Jim revealed two large vent-like openings—huge quarries in appearance—on two sides, as though masons had been at work for months with square, chisel and maul. Our guide called the openings craters of extinct volcanoes. They are certainly like them, but the late Mr. Murray refers to similar basalt formations as landslips. Their low height now would not give that impression to the layman, who looks for some reason why the large openings are circular, and asks whether frost could split up the basalt so evenly. No doubt the landslips occurred ages prior to the time when the fluviatile and atmospheric actions sculptured the country to its present form. Once again we found difficulty in walking over the stones from which the water had washed all traces of earth. But they certainly are useful to drain the slopes.

Snow poles, 10 feet in height, at frequent intervals mark the track from the Tawonga Hut, at 5500 feet, across the wide flat, furrowed in many places by our creek and its branch. Mountain Heath-myrtle, acres in extent and flowering in wild profusion, is a source of attraction to countless small lepidoptera, whose name we could not ascertain. We thought that we had sent good specimens, but our inexperience as entomologists evidently put the specimens out of court for identification. We passed the slip-panels and large stockyards, capable of holding 1000 beasts and more at one time; and the line of snow poles wound out, with the "Nigger Head" on our right, to the High Plains, at 5700 feet. Our minds try to picture the autumn mustering of the 8000 to 10,000 head of cattle now on the Plains: the noise of men, of their cracking stockwhips, the barking of dogs and lowing of cattle, as mobs, with all kinds of brands, are cut out and allocated to the many owners. The first snow is the warning to collect the stock. Snow, at time, comes unexpectedly early, when a way must be dug through the soft drift, and the track exposed for the mile-long string of cattle trekking back to the lowlands. The "Nigger Head" range, so named because the basalt outcrops resemble touseled black hair, rises to 5900 feet and overlooks our hut, also the West Kiewa, Mount Feathertop, and its extension along the Razor-back. It was the "Nigger Head" we climbed to watch, with misgivings, the progress of a bush fire that swept up out of the valley, 2000 feet below, over this range, well down our side, and caused us dam the creek, carry water to the hut, and prepare bags for beating out the invader. Twice we sat up till midnight, watching till the fires had sunk low. We found that the fires consistently burned at their lowest at midnight, but the smouldering, thick root-stock of the grass held the fire, which revived with the morning breeze.

On arriving at the High Plains the snow pole line divides, one branch turns to the right, zigzagging and skirting the opposite bank of the Nigger Head Creek and along the Kiewa under Feathertop, with numbered poles, till Dungey's track is reached. This track commences at Freeburgh, near Bright, winds up the deep gorge of the Kiewa, and continues towards Mount Hotham and over the Cobungra Gap. It is worth while turning off Dungey's track, near Blair's hut, to look at the small, tarn-like lake, with its three precipitous rocky sides and moss-bed outlet. The left-hand line of poles extends across the High Plains, past wooded Mount Jim, to the dome-shaped Mount Cope, 5 miles out, and still beyond, heading towards Glen Wills.

On the High Plains we had expected open, grassy, flat country, and were considerably surprised to find a very undulating area, some 7 miles by 3 miles, exposed, almost treeless, and generally grassy, but sometimes rocky and difficult to walk over. The Plains rise to 5900 feet, but fall away 3 to 400 feet into Pretty Valley, and, about 2 miles further on, into Rocky Valley. The former is about 1½ times the extent of the latter, and together they aggregate some 12,600 acres, which, it is probable in the future, will be converted by the Electric Scheme into what will prove two beautiful lake-like reservoirs, by means of high dams, 65 feet and 55 feet above the river-bed. At present there are two survey camps collecting data for the Electric Scheme—one under Mount Feathertop and the other near the Pretty Valley, under Mount McKay. I am indebted to the Electricity Commissioners for use of the map attached to their 1920 report, to serve as a guide to the locality. The East Kiewa, which flows through the valleys and runs over a rocky bed of gneisses, mica-schists, and quartzite, is nearly the same size as the Watts at Fernshaw, or the Badger at Coranderrk, without the overhanging vegetation.

We found much to interest us in the well-named Pretty Valley. A brace of duck rose from the river at our approach. Beautiful locustidæ of electric-blue sheen and with lanky magpie-coloured legs, lazily showed off their colour and balloon-like wings and invited further inspection. In fact, many natural history objects insisted on attracting attention. Rare plants were gathered, such as *Ranunculus Millanii*, *Pratia puberula* (*Lobelia Benthamii*), interwoven with tiny rush, *Juncus pusillus*. *Herpolirion Novae Zealandiae*, in damp ground, was a picture of large, pale-blue, almost stemless, flowers, rising out of the rigid, grass-like leaves. The pretty violet-streaked *Euphrasia antarctica* was found, and will also have to be now added to our Census. A part of the Pretty Valley, under the High Plains, is a huge moss-bed, and innumerable mountain trout, *Galaxias*, seemed quite oblivious to the drying water-pans, in which we found in flower the rare rush *Juncus crassiusculus*, and its close sister, *J. fluitans.*

We wandered leisurely over the Plains past Mount Jim. and so "home." *Stackhousia pulvinaris*, another rare plant (just finishing flower), revelled in the gravelly watercourse, and vied for most exposed position with the annual *Euphrasia, epacris petrophila* (in acre copses), and *Ranunculus Muelleri* (sheltering under the last-named). The *Pratia,* with its large, single, white flowers and succulent stems, crept along the depressions of the High Plains, also as high as 5900 feet, and *Myriophyllum pedunculatum* gave the water-pans a reddish tint. While examining some *Stackhousia pulvinaris* plants in fruit, with which was associated the rare dwarf grass *Agrostis Muelleri,* we found that a snake, 20 inches in length, had used two good-sized stones for sloughing—it had squeezed between them. Mr. J. A. Kershaw regards this as the White-lipped Snake, *Denisonia coronoides.*

Aciphylla glacialis, found between 5600 feet and 5900 feet, was less common about Fainter than about Feathertop. Bushmen call it "native celery," because of its flowers. It has stiff, sharp-pointed leaves that would not appear to contain much nutriment, so we wondered at its rarity. Our guide offered a possible solution, stating that cattle are fond of it and will almost eat it out. He had noticed a white fluid, of a milky nature, fall from their mouths during mastication. An acre of *Podolepis longipedata*, var. *robusta*, and adjoining an acre of *Helipterum incanum*, var. *alpina-album,* were a wealth of beauty on rocky slopes.

The Bundarrah river, a tributary of the Mitta, and 25 miles in length, has its source under Mount Jim, by a scarcely perceptible, shelving, grassy depression on the High Plains. When a mile had been covered, the contracted rock-bed had steep banks and took a sharp turn. Its bed was marked by stones devoid of earth, showing how great at times is the volume of water that rushes along, tearing through all obstacles. Close by were many flowering examples of *Brachycome scapigera*, at 5600 feet—the only plants we saw of this species. At present there was so little water that our guide had never seen the river so dry near its source, and two fishermen showed us a couple of dozen *Galaxias* which they had easily caught, to bait the more voracious imported rainbow trout, in the waters of the West Kiewa. Trout need no tickling in these clear mountain streams. We watched one fine fellow swim up and take the bait, and his subsequent struggles for freedom.

Some 4 miles from the Tawonga Hut, at 5360 feet above sea level, or half a mile from the sharp turn in the Bundarrah above referred to, is "Redbank," where the river has torn its way through enclosing banks, and 40 feet of yellowish brown clay is exposed for 20 feet above the loose stones in the river. Here is a fine fossil formation, 7 feet 6 inches from the grassy surface, lying on cement conglomerates with a primitive coal bed 18 inches thick, on top of 15 inches of laminar clay, containing leaf impressions. Higher up the stream 100 yards is a similar bank, showing examples of petrified wood. Mr. F. Chapman kindly made a cursory examination of the foliated clay we brought back, and we hope that he will find time to give a detailed report on this interesting collection of plant life in bygone times, which he considers of Miocene age, perhaps of Queensland rather than of Victorian Miocene assemblage. In the generic list he has supplied us with he includes two species of *Eucalyptus*, a *Banksia*, *Nothofagus*, the fern *Lastrea Dargoensis*, and refers some of the other impressions to *Nephelites, Lomatia, Callitris*, with a probable *Bombax*, also *Eucalyptus* and other fruits and reed-like plants. Mr. Chapman finds that the sample of lignite is well preserved and burns with a faint odour of india-rubber, while the specimen of coal shows leaf and stem remains.

We found on the banks of the river along the rocky edges the rare *Muehlenbeckia axillaris*, a relation of the lignums. It is interesting to note that the ferns at present growing in the vicinity of the fossil bed are *Blechnum penna-marina, Polystichum aculeatum*, and *Asplenium flabellifolium*, while about three miles away on the "Nigger Head," at a height of 5800 feet, we found *Dicksonia antarctica*, well-grown but without sori. This is, I think, a record height for this fern, which sheltered in the large hollow made by a watercourse. The species of Eucalypti now growing hereabouts are the Snow Gum, *E. coriacea*, var. *alpina*, and, at 5000 feet, *E. Gunnii;* while a few miles north grows *E. Sieberiana*.

We carried no entomological collecting outfit, and, as Mr. Hooke took exception to my crude methods, he is not to be held particeps criminis for the innocent insect lives taken, more especially those of the collection that proved unidentifiable, consisting of additional nocturnal lepidoptera and interlocked ground spiders, the latter caught while being attacked by a wasp. Mr. G. F. Hill, through Mr. J. A. Kershaw, has kindly identified some of the specimens found at 5500 feet as follows:—Scarabæidæ, *Diphucephala elegans;* Chrysomelidæ, *Paropsis sp.*; Locustidæ, *Tinzeda albosignata;* Acridæ, *Monistria grossa;* Gryllidæ, *Acripeza reticulata;*

Stratiomyidæ; an apterous female, Boreoides sp., near *subulata*. Tabanidæ, *Tabanus*, near *circumulatus*. In reply to our enquiry as to the pest so fond of riding on our backs, it would seem that *Musca vetustissima* was the culprit. We were interested in noting the number of these flies necessary to provide a meal for the tame, sleek lizards, which, when driven into the creek, found no difficulty in regaining the bank, scarcely touching the water, over which they appeared to glide rather than swim

One of our experiences, on returning, will not soon be forgotten. For some days we had seen many miles of the great Kiewa Valley burning fiercely between Mounts Hotham and Feathertop. Messrs. Galbraith and Guy, officers of the State Electricity Commission, accompanied by our guide, had gone back to Tawonga by way of Feathertop and Blair's hut. via Dungey's track. They had sensational experiences. Our only other route lay along the Kiewa-Omeo track, by which we had come. Hints had reached us, but we were not prepared for the blackened and smouldering countryside. Fortunately, we had begun preparations at daybreak, and made an early start. On rounding Mount Fainter we noticed the fire on the track-side, and a heavy bank of black smoke immediately ahead. The wind on top had increased to a gale and whistled among the dry Snow Gums, reminding us of the noise through the cordage of a "windjammer."

We kept steadily going till Bogong Jack's hut was reached, when we decided, in council, that George, one of the two young guides, should ride ahead each quarter of a mile and return to report, while Walter, who had charge of the packhorse, would urge "Sam" to his utmost We also considered that it would not be possible to get down the steep mountain-sides through rocks and scrub, as we were still over 5000 feet up, and it might even be necessary to cut the packs and get through without encumbrance A few yards inside the track the fire fiend roared fiercely up the slope, literally jumping from one gum tree to another. Dense clouds of smoke rolled over us, and the sun when seen was of copper. For 2 miles we raced, and our packs, thanks to Walter and George, stood the test so that we won by a narrow margin We did not pause, however, up the steep and stony track, as we were entering, at about 4000 feet, 3 miles of "Silvertop" (or, as the stockmen wrongly call it, "Woollybutt") forest, and now, half a mile down the Valley, was the fire following up. Few scents are sweeter than that of the leaves of *E. Sieberiana*, but a Eucalyptus forest, when the upper portions of the boles are bending ominously and straining in a gale, with stray branchlets falling, is not at such a time inspiring, especially when the ground is strewn with 20 stately giants close to your tracks—a memory of a former wind. The uppermost thought is apt to be, something might happen!

Coming through the blaze we had time momentarily to notice the panic-stricken birds that contrived to make weak music. Insects, in their efforts to escape the common enemy, scurried over the track, causing us to think of them. What instinct told them of the impending danger? Was it the smell of the burning leaves, or do insects hear the pandemonium caused by a raging bushfire? Do their kind give telepathic warning to other members of their world?

Altogether, at over 5000 feet, we collected 170 species of plants, as well as a number of varieties, and seven weeds. Omitted from the Census, which will now be added are the following:—*Euphrasia antarctica* and *Carex stellulata* (*C. echinata*). Very rare: *Alchemilla vulgaris*. Rare: *Juncus pusillus*, *J. falcatus*, *Heleocharis multicaulis*, *Scirpus crassiusculus*, *Muehlenbeckia axillaris*, *Geranium sessiliflorum*, *Pratia puberula* (*Lobelia Benthamii*) The last two recorded previously only from "The Cobberas." Alpine only: *Stackhousia pulvinaris*, *Aciphylla glacialis*. N.E. and Baw Baws only: *Callistemon Sieberi*, as well as *Scleranthus mniaroides*, *S. biflorus and Diander.*

Astelia alpina, *Exocarpus nana*, *Nertera depressa*, *Pentachondra pumila*, all strictly alpine, bore pretty scarlet fruits as well as flowers.

The fact of our being without horses on top, except for one day, was not without advantage to us as collectors. Hands and knees were in evidence, and consequently close examination and careful handling made for better inspection. One cannot make exact determinations from distant observation, either from coach or horseback. Some may do it, but it is bad, as a rule. I am indebted to Messrs. J. W. Audas and P. Morris, of the National Herbarium, of whose assistance the Club's botanical members are always glad to avail themselves. Messrs. L. T. Guy and W. Maddison kindly helped me to place some of the features I have added to the map.

Some, not naturalists, have asked us what we do on our outings and how we employ our time, and think, like the fox in Galsworthy's reverie, "that man is a kind of fox and should kill for the love of killing." I think we have shown that the naturalist's time can be fully occupied on an all-too-short holiday.

G. A. KEARTLAND

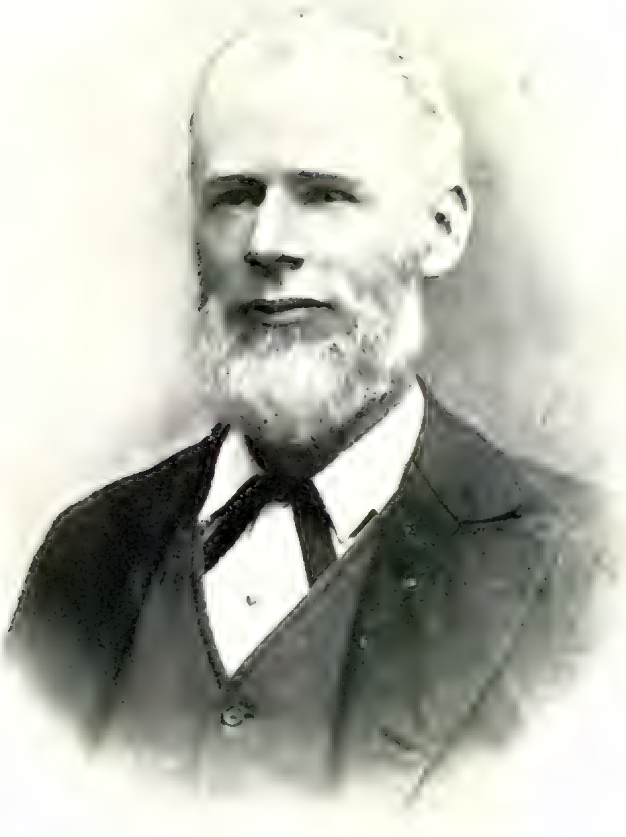
The death of Mr. G. A. Keartland has removed from amongst us one of the early members of our Club, and one of its most loyal and enthusiastic workers during a period extending over 40 years. He has told us how, in his younger days, he spent his time in studying the habits of our native fauna, examining nests, collecting eggs, and capturing mammals, birds and reptiles to make pets of them, and visiting the Museum to find out their proper names.

One day in 1886 he saw a notice of a meeting of the Field Naturalists' Club, and, coming into contact with Mr C. French, senr., was nominated by him as a member. To use his own words: "I attended the next meeting (early in 1886) with very anxious misgivings, and walked past the gate of this hall twice before mustering courage to enter." Once inside, however, he found himself in congenial surroundings, and received from the older members help and encouragement such as in later years he passed on to junior members.

"I started home," Mr. Keartland says, "from my first meeting with a fixed determination to study all branches of natural history. However, after attending a few meetings and excursions I learned how vast was the contract I had undertaken, and decided to confine my attention to one branch, Ornithology, which had always occupied the chief share of my thoughts." He wisely lost no opportunity of taking part in the Club excursions, and thereby learnt much from other workers with whom he soon became intimate—Forbes Leith, A. J. North, C. French, D. Best, W. Kershaw, J. A. Kershaw, A. J. Campbell, F. G. A. Barnard, Dr. W. Macgillivray, J. Gabriel, and others — and at the same time came to rank amongst them as a leading member of the Club, and rendered it most valuable assistance, which was recognised by his election to the committee, and finally to the Presidency in 1907.

His early field work stood Mr. Keartland in good stead, as was shown in his first paper published in 1890, in which, contrary to the opinion of Gould, he affirmed that there were two species of Teal. He says: "I read a paper on the subject and produced specimens shot in the month of June in support of my contention, which has since been fully recognised as correct."

PLATE II



G. A. KEARTLAND

Mr F G. A. Barnard, in describing his first meeting with Mr. Keartland, relates how, as leader of an excursion, when the weather was unpropitious, he was rather nonplussed by finding that only one member of the Club, then unknown to him, turned up. He was evidently rather lame, and the leader felt somewhat anxious about the capacity of his companion to walk and climb. Before the wet afternoon was over, his doubts on this point were completely set at rest, and he soon found that enthusiasm and strength of will triumphed over any slight physical infirmity, for his companion could walk and climb just as well as his leader.

The first time that the writer came in contact with Mr. Keartland was on the occasion of the Club excursion to King Island, in 1887. At that time the Island was occupied only by two lighthouse-keepers and a solitary wallaby hunter. There were no roads: the hunters of the sea elephants had left it just as primitive as when Lesueur and Péron, the naturalists on Baudin's expedition, visited it in 1802, except that, unfortunately, its wombats and emus had been ruthlessly exterminated by the hunters. On this expedition, though no new forms of animal or plant life were secured, the members of the party gained valuable experience, and, in a later expedition to the Kent Group in 1890, Mr. Keartland had special facilities for studying the sea birds of Bass Strait.

From the point of view of natural history, perhaps his most important field work was done as a member of the Horn Expedition to Central Australia in 1894. His main work was the collecting of and taking notes on the birds. It was only rarely that more than one day was spent in the same camp, but he was indefatigable, and, under conditions that would soon have damped the ardour of a less enthusiastic and conscientious worker, he secured a large collection representing typical and varied examples of 78 species, together with most valuable field notes in regard to them, and 20 other species that he knew well.

In the winter months in the Macdonnell Ranges the nights are often bitterly cold, but this made no difference to him, and hour after hour he used to work away by the light of a flickering lamp, with a rug wrapped round him, and the water frozen in a billy-can. The skins were beautifully prepared and descriptions of them, together with the field notes, were published by Mr. A. J. North. Amongst them were four new species, the name of one of which *Ptilotis keartlandi*, together with that of a plant *Gardenia keartlandi*, and of a physical feature, Mt. Keartland, testify to the zeal of the naturalist.

His work on the Horn Expedition led to Keartland's selection as naturalist on the ill-fated Calvert expedition to investigate the desert region in north-west Australia in 1896. Warburton, Giles, Forrest and the Elder expedition had crossed from east to west, finding no permanent waters or good country. Great lines of rolling sandhills ran from W.N.W. to E.S.E., and the early explorers travelled in the valleys between them. A gap of 300 miles lay between the tracks of Warburton and Giles, and an attempt was now to be made to cut it at right angles. The expedition was under the charge of L. A. Wells, who had with him four white men, his cousin, C. F. Wells, G. L. Jones, geologist, G. A. Keartland, naturalist, and Trainor, cook. It was an arduous and perilous undertaking, and only three returned.

In the *Naturalist* for 1916 Mr. Keartland published a few notes, but no full account of the expedition has apparently been written. Leaving Mulawa, inland from Geraldton, in June, the party started off with 20 camels. Early in September they were well into the desert, and crossed altogether some 700 miles of sandhill country. "Sometimes," says Keartland, "half a mile of flat divides these sandhills, but occasionally they were so close together that the leading camels in the caravan were ascending another before the last of the team had descended the previous one." After long travel, C. F. Wells and Jones left the main party to examine country to the W.S.W., with the intention of cutting the tracks of the latter near Joanna Springs, but they were never seen alive again. L. A. Wells and Keartland travelled on as arranged to the Fitzroy, but it was a perilous journey. Telegraphing from the Fitzroy on November 10, Wells says that from Mt. Bates to within 52 miles of the Fitzroy, a distance of 500 miles, they passed through a wilderness of continuous, high, steep sand ridges and spinifex. The heat was so intense and the work so arduous that the camels collapsed 170 miles from the Fitzroy. Of the latter distance 50 miles was traversed on foot by moonlight, and 120 by starlight.

"We were obliged," says Wells, "to abandon Keartland's and Jones' collection, all equipment, provisions and personal effects at 160-170 miles back, only taking absolute necessities to carry us through to the Fitzroy." There was, however, one personal effect which Keartland — and it was very characteristic of the man — did not abandon. That was a gun lent to him by a friend, and that gun he carried day after day as he trudged across the sandhills; brought it safely back and handed in to his friend without a word of what it had cost him.

It is only right, in connection with these expeditions, to refer to the fact that shortly after his arrival from England at an early age he entered the service of the "Age," and was employed as a compositor for more than 50 years. The proprietors of this journal, recognising his integrity and single-minded devotion to natural history, treated him with great consideration and generosity, granting him leave of absence for his expeditions, and absolving him from hard work in his later years.

Keartland was much more than a mere collector His great delight was to watch and note the habits of the living birds, many of which he reared. A typical example of this is to be found in the *Naturalist*, March, 1899. It refers to two quails, that he placed in an aviary with cockatoo parrots and a green leek parrot, and shows his keenness of observation. After hiding under grass for a month, they selected, he says, a camping place and began to show themselves. Seven eggs were laid. The green leek showed great dislike to them, so, after a week, it was removed, and the hen bird sat in peace. A glance at her when sitting showed how these birds manage to cover such large clutches. The long feathers on the side of the breast spread out at right angles until the bird would hide an ordinary tea saucer. The male bird took no part in incubation. When the chicks appeared he kept away from his family, perching with the parrots, but, later on, says Keartland, his mind changed, and he was in constant attendance on them.

One of the most interesting of his finds on the Horn Expedition was the rediscovery of the lovely Princess Alexandra parakeet, then known as *Polyteles alexandrae*. It had been found first by Waterhouse, during McDouall Stuart's expedition in 1861, at Howell Springs, far away in the north, and had practically disappeared. To quote Keartland's own notes: "They were only once seen in desert oak forest between Glen Edith and Deering Creek. The advance party had halted for lunch, and, on my arrival, Professor Tate said he had seen a strange looking parrot in the oaks. I started off in the direction indicated and saw what appeared to be a cockatoo parrot flying towards me. Having carefully noted the branch on which it perched, I hurried forward, but, notwithstanding the sparse nature of the foliage, I had to look carefully for some minutes before I found it. . . . Five birds flew into one tree, and I had to walk round three times before I saw them. At last four heads were visible just raised from the thick limbs, the bodies and tails lying horizontally along the timber."

Fired by Keartland's enthusiasm, every man in camp went out—whites, blacks, Afghans, even the old camp cook forsook his pots and pans and took part in the Polytelis pursuit. I have a suspicion that Keartland very wisely directed us to spots where it was unlikely that specimens would be found, and went away quietly by himself to where he thought the flock was feeding. I only judge of this from the quaint, curious twinkle in his eye when we returned birdless, and found him busy skinning a number of specimens which, later on, Mr. North said were "all in splendid plumage and condition, and form the finest series of cabinet skins of this species yet secured." It was this series that showed the presence of a spathulate second primary feather in the wing of the male bird, so that a new generic name, *Spathopterus*, had to be invented. Later on, from Messrs. C. E. Cowle and P. M. Byrne, and other friends in central Australia—and he made and enthused friends wherever he went—he received living specimens and eggs and was able to determine their distribution.

It was not only that kind of work in which he was interested. When the question of the reservation of a great national park at Wilson's Promontory came before the Club in 1907, he was chosen as one of its representatives to place the matter before the Government, and, during the same year, he acted as a member of the Club's committee in negotiations regarding the working of the Game and Fisheries Act. He was our greatest authority on questions of the close season for opossums, ducks, quails, etc., and in these matters his first-hand knowledge has been of the greatest value and has indeed had much weight in guiding and determining legislative action.

To all of us interested in the natural history of Australia, Keartland represents the highest type of a true naturalist, but he was indeed more than this—he was a brave, great-hearted man.—W.B.S.

At the entrance to the St. Kilda Town Hall drive, recently, portion of the asphalt was raised about four inches and cracked in several places. When the layer of asphalt was removed a group of mushrooms, about 12 inches in diameter, was revealed. Undisturbed, they would probably have forced their way completely through the asphalt.—SYBIL HEYMANSON.

Forest Regeneration in Gippsland

By Miss J. Galbraith.

The following notes are necessarily incomplete, as visits to the locality described were made at such irregular intervals, and were of such short duration, that it was impossible to keep full records. The area over which the effects of the fire were noticed—several square miles of hilly country east of the Tyers River—has poor soil overlaying silurian limestone, with, for its eastern boundary, a narrow iron-stone ridge; and, for its western limit, a flatter sandstone ridge. The northern side ends in a long gully, running at right angles to these ridges, which ended on the south in another gully, parallel with the first. This second gully reaches the Tyers River, which here bends sharply, just within the western limit of the area.

The hilltop vegetation, before the 1923 fire, consisted of *Eucalyptus Sieberiana*, with small patches of *E. obliqua* and *E. capitellata*, and beneath them a dense growth of shrubs and small plants. *Acacia linearis* seemed to be the commonest shrub, but thickets of *Daviesia latifolia*, *Goodenia ovata*, *Cassinia aculeata* and *C. longifolia* were hardly less numerous. *Helichrysum oblongifolium*, in many places, grew among the *Cassinia*. *Lomatia ilicifolia* and *Olearia myrsinoides* were scattered through the other growths. Bracken was common, and among it grew *Tetratheca ericifolia*, *T. ciliata*, *Dampiera stricta*, *Epacris impressa* and *Pultenaea Gunnii*. In a few places *Platylobium obtusangulum* and *Goodenia geniculata* carpeted the ground, while *Isotoma fluviatilis* filled the roadside hollows. On the ironstone slope *Eucalyptus polyanthemos* grew, and in the valleys *E. goniocalyx* was the only Eucalpt. *E. globulus* grew near the river. On the ironstone both *Daviesia corymbosa* and *Dillwynia* grew and with them *Goodenia ovata* and *Cassinia longifolia*. Few small plants were found there, and little bracken. The commonest small growths were *Brachycome multifida* and stunted bushes of *Correa rubra*. The gully vegetation needs no description, since it yet remains unburned.

The only orchids noted in the area, before the fire, were *Dipodium punctatum*, common, and *Prasophyllum brevilabre*, in only one place. The fire of March, 1923, left the ground, except in the gullies, bare and black. Only the large Eucalypts remained, black, and bare of green. We did not, after the fire, visit the locality until December 23 of the same year. Every tree was then covered with a clustering growth of adventitious branchlets. In many places were low thickets of *Acacia linearis*. *Lomatia ilicifolia* was common everywhere, flowering profusely. Bracken was everywhere, and with it short tufts of *Xerotes*, sp.? *Xanthorrhœa minor* on every side uplifted fading spikes of bloom. A few plants of *Helichrysum leucopsidium* were noted. Tufts of *Amperea spartioides* and *Dampiera stricta* dotted the hill-tops. *Olearia myrsinoides* was seen, with a few open flowers, while in many places the earth was blue with blossoms of *Lobelia rhombifolia*, or bright with leaves of seedling Eucalypts, chiefly *E. Sieberiana*. In a few roadside hollows tiny plants of *Acacia verticillata* were seen.

The change in the bird life of these hills was not so great as that in the vegetation. Small birds, Thornbills, Blue-wrens, etc., had been common, but now were rarely seen or heard, while the larger species, Honeyeaters, Robins, etc., seemed only to have retreated to the gullies, where also Eastern Whip-birds and a Lyre Bird were heard. Tree-creepers, *Climacteris leucophaea*, and Gang-gangs, *Callocephalon fimbriatus*, had returned to the Eucalypts on the hill-tops, where the Grey Shrike-thrush, *Colluricincla harmonica*, again made music.

Our next visit, January 22, 1924, revealed a further change in the vegetation of the area. *Dipodium punctatum* was unusually common, and its spikes of bloom were large and deeply coloured. We saw hardly a flower and very few plants of *Lobelia rhombifolia*, but where it had been grew its even lovelier sister, *L. gibbosa*, now in bloom. The plants were very fine; some measured were two feet high. *Thysanotus tuberosus* was common and flowering freely, while through them all *Lomatia* still bloomed. On the sandstone ridge, which we had not visited in December, the flowers were wonderful. Beside species already mentioned, and long prostrate stems of *Goodenia geniculata* and *Dampiera stricta*, there were stretches of the hillside hidden by the lovely white and rose blooms of *Helichrysum leucopsidium*. Many chains of the roadside were blue with great, bushy, flowering plants of *Wahlenbergia gracilis*, mingled with Weeping-grass, *Microlaena stipoides*, and a few tall plants of *Gnaphalium japonicum*. Here the varying forms of Bluebells were very noticeable as they grew in distinct patches, blue and white, large and small, with petals pointed or round. Every bush of *Olearia myrsinoides*—and here there were many—was white with flowers.

Visiting the area, except the sandstone ridge, on September 27, 1924, we found little but thickets of *Acacia linearis*, *Goodenia ovata*, *Daviesia latifolia* and *Eucalyptus Sieberiana*, all from three to six feet high.

On our next visit, October 16, we examined the ironstone ridge. Except in that place little change was noted in the vegetation. Small plants of *Acacia myrtifolia* and *Daviesia ulicina* were seen in an open space. Near the roadside we noticed *Cassinia longifolia* and *Helichrysum oblongifolium*. Growing in the poor soil amid the outcrops of ironstone, Daviesia latifolia and D. corymbosa were flowering, as was Red Box on the western slope. *Brachycome multifida*, *Astroloma serrulata*, *Tetratheca ericifolia* and *Lomandra filiformis*, all growing strongly, were in full bloom. The broad-leaf form of *Hibbertia linearis* was unclosing its first flowers. *Olearia myrsinoides* promised a wealth of summer bloom, and *Hardenbergia monophylla* was losing its last flowers.

Where the earth was still black and almost bare, ten species of orchids flowered, and large spaces were dotted with leaves of *Corysanthes pruinosa* and *Acianthus exertus*. We must have seen dozens of large patches of *Chiloglottis Gunnii*. All the plants of this species were unusually large, many being four inches high. *Caladenia carnea* and *C. testacea* were very common, while *C. congesta* and *C. angustata* were hardly less numerous. Only two specimens of *C. dilitata* were seen, and one each of *Diuris longifolia* and *Cyrtochilus Robertsonii* Several small groups of Thelymitra, sp.? were seen. *Glossodia* was common here as in all open parts of the burned area.

On our next visit, January 26, 1925, we found *Acacia linearis* and *Daviesia latifolia* growing luxuriantly. On the sandstone ridge was a dense growth of *Eucalyptus Sieberiana*, four to six feet high. *Dipodium punctatum* was again common, but we saw only a few plants of *Helichrysum leucopsidium*, while *Lobelia gibbosa* and *Wahlenbergia gracilis* were even more rare. *Lomatia ilicifolia* was not flowering, and the few visible bushes of *Olearia myrsinoides* carried only one or two small flowers. *Goodenia geniculata* and *Dampiera stricta* were flowering freely. Near the river was a number of small Blue Gums.

A visit in July showd little change in the vegetation. Birds were more numerous. Peaceful Doves were noted as new arrivals.

On September 18 we again examined the ironstone spur. Despite careful search we found no sign of any orchid save *Caladenia carnea*. *Cassinia*, three species of *Daviesia*, *Acacia* *linearis* and bracken covered the hill top. Through the whole area *Eucalyptus Sieberiana* was flowering. *Hardenbergia monophylla*, *Bredemeyra volubile*, *Tetratheca ericifolia* and *Pultenaea Gunnii* were flowering amid the *Acacia* and *Daviesia*, also in bloom.

At the time of our next visit, January 28, 1926, all was much the same as a year before, with taller shrubs and still fewer small plants visible. *Cassinia* and *Helichrysum oblongifolium* were much in evidence. Blackened tree-trunks still tufted with adventitious growth, were almost the only signs of the passing of the fire.

On February 23 we found the trees again without green, and the ground black and unbroken by anything but one or two logs, from whose glowing hollows smoke still rose. Some of the young trees, which had grown since the 1923 fire, still stood, dropping their brown leaves slowly to the ground. No birds were seen, but far overhead we heard a Gang-gang crying as it flew.

Visiting the area on April 5, we found the trees, young and old, wreathed with adventitious growth. Beneath them bracken was already a foot high, and the black earth was spotted with tufts of *Xerotes*, sp.?

THE WAYS OF POUCHED-MOUSE.

The Yellow-footed Pouched-mouse was referred to in a tentative way in my letter to the Editor (*Naturalist*, *September*, 1924), when I invited information. Near Everton I had seen this busy little insect-eater, in a Red Box forest, apparently seeking its food on the rough bark of the stem and branches of the low-spreading trees. Recently I had an opportunity of improving acquaintance in the forests of Grey Box and Yellow Gum near Bealiba. There, in an area undergoing improvement, and in a part of it denuded of trees, I saw the marsupials moving about and in and out of old stumps. Not easily observed at any time, they are seen after an alarm by patiently watching the crevices and knot-holes where presently two tiny points of light indicate the fact that the watcher is watched. From enquiries made among forests workers, I learned that the young of this mouse rarely number more than six. An interesting note was given me by Mr. Coburn, of the forests service. He examined a nest of one of a flock of birds (which, from his description, I take to be the Apostle Birds) and found therein a marsupial mouse comfortably domiciled with her five young ones.—A. D. HARDY.

VICTORIAN FERNS

BY H. B. WILLIAMSON, F.L.S.

PART VI.

Genus CYCLOPHORUS.

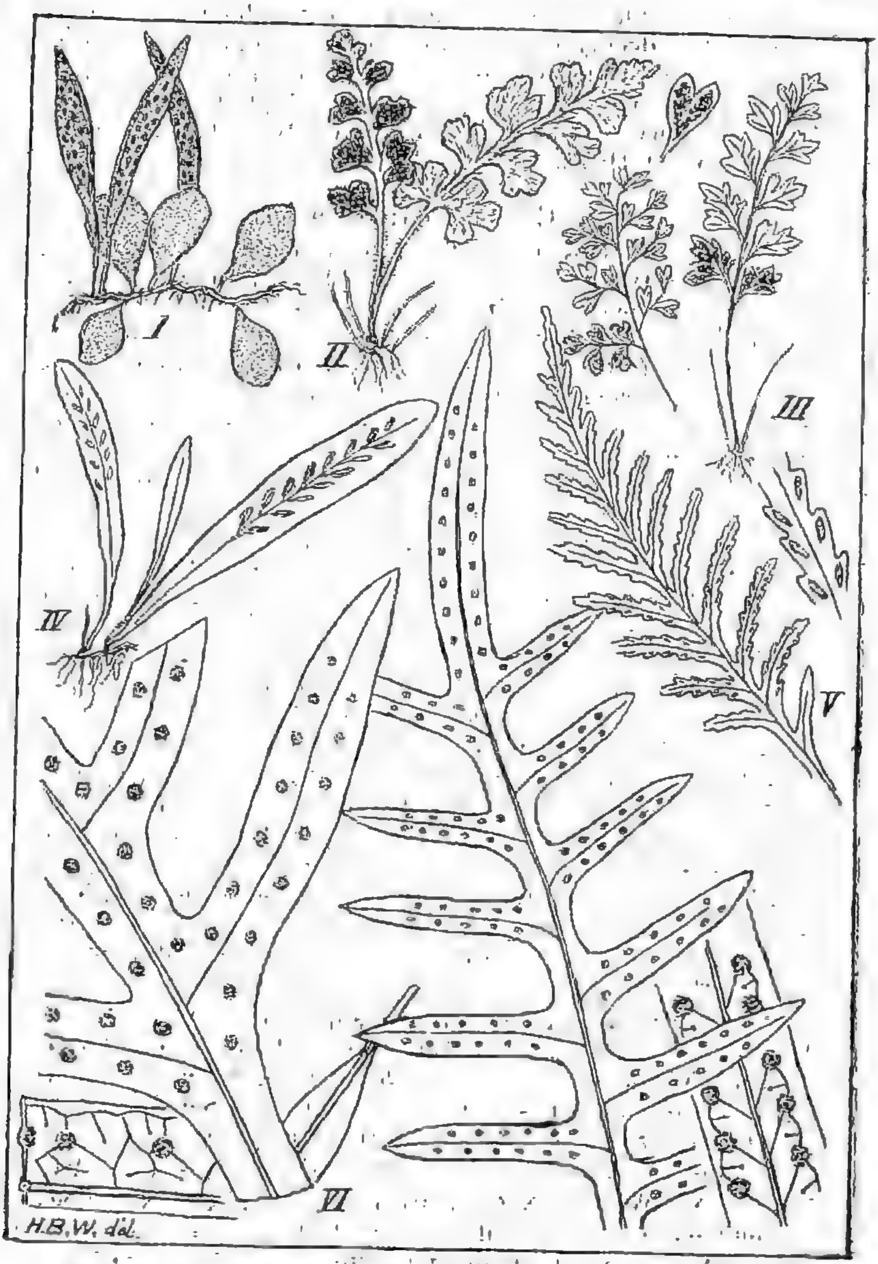
CYCLOPHORUS SERPENS (Forst.), C. Chr. Creeping Polypody (Fig. I). V., N.S.W., Q., P., N.Z. This is a strange-looking fern found growing in matted patches on the trunks of ferns in E. Gippsland. The fronds spring from amply-rambling rhizomes, and are generally green above, and of a silvery white or yellowish below, and beset with minute starry hairs which require the use of a microscope to reveal their beauty. Barren fronds are shorter and wider than the fertile ones, and the sori are irregularly crowded among the dense stellate hairs, sometimes running together when old, and causing the upper surface of the frond when narrow to curl backwards until the surface is scarcely visible. It appears that the form that we have in Victoria is the variety *rupestris* (R.Br.) Domin.

Genus PLEUROSORUS.

PLEUROSORUS RUTIFOLIUS (R.Br.), Fée. Blanket Fern (Fig. II). All parts of Australia, E., S. Am., N.Z. This is a common fern growing in all districts of Victoria, and is often seen in association with *Cheilanthes* and the trailing *Asplenium flabellifolium*. The fronds are tufted, 4 to 6 in. long, pinnate. The pinnæ are obliquely fan-shaped, about 5 inches long, toothed or lobed, and beset with dense, brown, scaly hairs occasionally glandular, the upper surface less so. The sori are linear, mostly about the middle of the pinna, sometimes almost covering the surface.

Genus ANOGRAMMA.

ANOGRAMMA LEPTOPHYLLA (L.), Link. Delicate Rue Fern (Fig. III). T., V., N.S.W., W.A., and widespread throughout the world. This delicate little plant, reminding one of a Filmy Fern in texture and veining, rarely reaches more than 3 inches in height. In his *Botanic Teachings*, Mueller writes:—"This is the smallest and most delicate of all our Polypodiaceæ, and it is further remarkable among them for its transparent tender-membranous fronds. It is of very sparse occurrence, for which scarcity its merely annual duration so unusual among ferns seems to account." The



I—CYCLOPHORUS. II—PLEUROSORUS. III—ANOGRAMMA.
IV, V, VI, VII—POLYPODIUM.

segments are numerous, oblong or cuneate, about ¼ inch long, more or less deeply lobed, with usually a single oblong sorus on each lobe, often covering the whole surface. It has been found on the Yarra River, at Hexham, Skipton (Whan), Mt. William, Lorne, Otway Forest, Lake Burrumbeet (T. S. Hart), and at Heathcote.

Genus POLYPODIUM.

The four species we have in Victoria are found growing in places away from the ground, and seem to need no soil for their growth. Their fronds spring from a rhizome attached by its roots to logs or trunks of ferns or trees, and in the case of the two larger ones the rhizome often creeps up to a great height. The sori have no cover, and resemble those of *Alsophila*, except that they are not raised above the surface of the frond. In the case of the two larger species, the sori are so sunk into the frond (immersed) that they show on the upper surface. The two smaller species belong to a section with veins diverging from the midrib and simply forked or branched. One of these, *P. Billardieri*, has entire fronds, while the other, *P. grammitidis*, has divided fronds with its segments lobed.

The veining of the two larger species is reticulate between the more or less parallel primary veins, with a small, free, usually club-shaped veinlet in many of the areoles (spaces or meshes in the veining).

P. BILLARDIERI (Willd.), C. Chr. Finger Fern (Fig. IV). T., V., N.S.W., Q., Am., N.Z. The fronds are entire, usually 3 or 4 inches long, and ¼ inch broad, of leathery texture, which conceals the veins. Sori are oblong or linear, rather long, oblique, and parallel in a single row on each side of the midrib, and, when old, often confluent, covering nearly the whole surface. It has been recorded from all districts of Victoria.

P. GRAMMITIDIS, R.Br. Gipsy Fern (Fig. V). T., V., N.S.W., N.Z. Fronds are about 6 inches long, rather thinner in texture than those of *P. Billardieri*, pinnatifid, with segments lobed and sometimes pinnatifid. Sori as in *P. Billardieri*. It is common in the south and east.

P. DIVERSIFOLIUM, Willd. Kangaroo Fern (Fig. VI). T., V., N.S.W., Q., N.Z. This is the large, leathery fern so common on tree trunks in our fern gullies, and which some call the Staghorn or Elkhorn—names that should be restricted to the genus *Platycerium* of Queensland and New South Wales. It bears fronds up to 18 inches long usually pinnatifid with few segments, but sometimes entire and about 8 inches long. Segments are mostly sharp-pointed, 3 to 6 inches long, and about ½ inch broad, confluent at the base into a broad-winged rachis. The veining is net-like, with free veinlets in the areoles. The sori are orbicular, rather large, distant in a single row on each side of the midrib, and so much immersed in the frond as to show raised "blisters" on the upper side, hence Forster's name "pustulatum." It has been recorded in all districts of Victoria but the north-west.

P. PUSTULATUM, Forster Scented Polypody (Fig. VII). V., N.S.W., Q., P., N.Z. This fern is much rarer than the last-named, and is distinguished from it by having fronds of a much thinner texture with shorter and narrower segments, fragrant when fresh. According to Dobbie, *New Zealand Ferns*, the Maoris formerly used it for scenting oil. The pustules on the upper surface are less apparent than in *P. diversifolium*, and, having narrower segments, the sori are nearer the edge, and occupy a relatively greater portion of the frond surface.

NEW AND RARE LAND SHELLS.

Many land shells were collected at Byfield, near Rockhampton, Queensland, during the Royal Australasian Ornithologists' Union camp-out in 1924. All the material has not yet been studied, but I understand that it includes two new species and several rare forms. Recently Mr. S. W. Jackson, who has collected land shells in many parts of Australia, and made notable discoveries, kindly sent me two Byfield shells found by Mr. H. G. Barnard, in March, 1926. One species, a large and handsome shell, is new, Mr. Jackson informs me; and the other, *Thersites curtisiana*, var. *pallida*, Hedley, was previously known only by the type specimen, in the Australian Museum, collected by Mr. C. Hedley, near Rockhampton, in 1889. Mr. Barnard's specimens were obtained in the vine scrubs after very heavy rains.

At Byfield, with the ornithologists, I devoted some time to shell-hunting, with considerable success. Immature specimens of *T. curtisiana*, var. *pallida*, were found under a large stone in a damp spot, and, with other species, in a banana plantation. Banana leaves, rotting on the ground, concealed many snails—more than did jungle debris, old logs, etc. Three exquisite *Helicarion* (? sp.) shells were found in a moist cavity in the forked trunk of a tree. Beneath damp bark on boles and fallen boughs, several minute snails were discovered.

The Victorian Naturalist

Vol. XLIII—No. 3. JULY 5, 1926. No. 511.

FIELD NATURALISTS' CLUB OF VICTORIA.

The annual meeting of the Club was held in the Royal Society's Hall, Victoria Street, on Monday evening, June 14, 1926 The President, Mr. Geo. Coghill, occupied the chair, and about 60 members and friends were present.

LATE MR. G. A. KEARTLAND.

The President referred to the death of Mr. G. A. Keartland, who had been a member of the Club for 40 years, and asked members to stand as a mark of respect.

The President also mentioned that another member, Mr. W. H. Callister, and Mr. J. J. Fletcher, of Sydney, had died since the last meeting. It was resolved that letters of condolence be sent to the relatives.

CORRESPONDENCE.

From Mr. F. Lewis, Chief Inspector of Fisheries and Game, regarding Sperm Whale Head. Mr. Lewis stated that he had had the matter under consideration for some little time, and was only awaiting definite details as to what were likely to be the best boundaries in order that action might be taken to have the area definitely proclaimed a sanctuary.

REPORTS.

Reports on excursions were given as follows: National Museum, Mr. F. Chapman, A.L.S.; Mount Evelyn, Mr. L. L. Hodgson. Mr. F. G. A. Barnard referred to the social evening held at 17 Monomeith Avenue, Canterbury, on May 22, when the President and Mrs. Coghill entertained about 30 members, who spent a very pleasant and interesting evening. Mr. F. Pitcher moved that the thanks of the members who attended the function be tendered to Mr. and Mrs. Coghill. The motion, seconded by Mr. Barnard, was carried unanimously.

ELECTION OF MEMBERS.

On a ballot being taken, Miss Cottrell, 30 Davis Avenue, South Yarra; Miss E. Powles, 49 Rowell Avenue, Camberwell; Miss M. E. Smytheman, 30 Davis Avenue, South Yarra; Miss Edith Raff, Banool Avenue, Kew, Mr. W. H. Nicholls, 132 Geelong Road, West Footscray; were elected as ordinary members, and Mr. D. Orchard, Kinglake, as a country member.

GENERAL.

Mr. A. J. Tadgell read a newspaper report relative to the cutting of grass-trees (*Xanthorrhœa*) in the Grampians. Such operations might involve the destruction of much of the native flora. He moved that the matter be referred to Messrs. C. W. D'Alton and F. D. D'Alton, at Hall's Gap, Grampians, for information. Mr. Keep seconded the motion, which was carried unanimously.

Mr. Pitcher drew attention to the presence of Miss Cottrell and Miss Smytheman, two teachers from England, who had joined the Club. The President welcomed these ladies.

The Hon. Secretary read the 46th Annual Report. Mr. P. F. Morris moved that the report be received and adopted. Seconded by Dr. H. Green and carried.

ANNUAL REPORT.

"To the Members of the Field Naturalists' Club of Victoria.

"Ladies and Gentleman—

"In presenting the 46th report, for the year ended April 30, 1926, the Committee desires to thank members for the hearty support received from them during the year, and to congratulate them on the continued success of the Club. During the year 30 new members were elected, consisting of 22 ordinary, 4 country and 4 associate members, while there have been 20 resignations, leaving a membership of 254. The monthly meetings were held regularly, and were well attended, as usual, the average attendance being about 60—members and friends. During the year 11 papers were read, and 2 lectures and 1 address given, all of which, it is hoped, the members found interesting and instructive covering, as they did, a wide range of subjects. They were contributed by the following:—Sir W. Baldwin Spencer; Messrs. L. G. Chandler, F. Chapman, A.L.S., J. Clark, C. Daley, B.A., F.L.S., J. C. Goudie, A. D. Hardy, T. S. Hart, M.A., A. E. Keep, P. C. Morrison, M.Sc., C. Oke, W. J. Parr A. E. Rodda, and Lance Le Souef.

"The excursions are always popular, and as usual, most of them in the past year were well attended. A number of short half-day trips were made to places around the metropolis, and whole day excursions to the You Yangs, Greendale, Brisbane Ranges, Belgrave, Labertouche, Bunyip, Sherbrooke, Macedon and Mount Evelyn, while more extended excursions were made to Bendigo, Wilson's Promontory, Mornington and the Hopkin's River.

"The Annual Exhibition of Wild Flowers was held in the St. Kilda Town Hall, on Tuesday, September 22, and was opened by the Hon. F. W. Eggleston, Attorney-General. Although it was a little earlier in the season than usual for our show, a very fine display of flowers, ferns and shrubs was staged by a number of capable and energetic workers, to whom much of the success achieved was due. The result was a profit of £112/6/7, of which amount £55 was given to the Victorian Bush Nursing Association. In returning thanks for the donation, the Association invited the Club to nominate three members as Life Governors. Miss E. H. Gabriel, Mr. Geo. Coghill, and Mr. F. Pitcher have been nominated.

"The 42nd volume of the *Naturalist* has been completed, and we are indebted to Mr. C. Barrett for the capable way in which he has edited our journal. Fortunately, funds have permitted a larger journal and more illustrations than usual, and it is proposed to have at least one full-page illustration in each number as long as funds permit.

"The Hon. Librarian, Dr. C. S. Sutton, reports that the library was made use of by members to a fair extent during the year. Several new publications were received in exchange for the *Naturalist*. The binding of some eighty volumes is in progress, and it is expected that these will soon be available for members.

"Your Committee has given its consideration to several measures for the preservation of our fauna and flora, and more especially to obtaining the permanent reservation of Sperm Whale Head as a National Park for Southern Gippsland.

"The Committee desires to express its thanks to Messrs. Coghill and Haughton for the use of rooms for Committee meetings. Attendance at the twelve Committee meetings held during the year was as follows:—Dr. Sutton, Messrs. Oke and Williamson, 12; Mr. Coghill, 11; Messrs. Barrett and Chapman, 10; Mr. Pescott, 9; Mr. Daley, 7; Messrs. Barnard, Searle, St. John and Wilson, 6; Mr. Kershaw, 5; Mr. Hooke, 2.

"In conclusion, your Committee desires to thank all who have helped forward the work of the Club during the year, and trusts that the same generous support will be given to the new Committee, allowing fresh opportunities for the study of natural history in its many branches.

"On behalf of the Committee,
"(Signed) GEO. COGHILL, Chairman.
"CHAS. OKE, Hon. Sec."

Melbourne, May 26, 1926.

The Hon. Treasurer submitted the 46th Annual Statement of Receipts and Expenditure, and drew attention to the following points of interest:—

FINANCIAL REPORT.

The Financial Statement for the 12 months ended April 30, 1926, reveals the following facts in comparison with figures of the preceding year:—

Subscriptions have increased by £45, from £153 to £198. This increase is clearly a result of the raising of subscription rates, which took effect from May 1, 1925, as the income under this heading averaged £155 for the 3 previous years. It was estimated at the beginning of the period that the new rates would bring in £192, provided that no members were lost on this account. A justification of the action seems to lie in the net increase of members during the year, coupled with the realising of the expected amount of subscription money.

Amongst other regular sources of income, sales of the *Victorian Naturalist*, totalling £30, show an increase of £9 on the last period, this amount including the sale of one complete edition at £18.

An estimate prepared 12 months ago, enabled it to be seen that an expenditure of about £20 per month upon the *Naturalist* should be within our means. This has been carefully adhered to, with the result that the cost of producing and circulating the magazine has amounted to £250. Though this is an advance of £50 on last year, it may be noted that it is equalled by the subscription increase already referred to.

Other expenses of general maintenance, which last year amounted to about £40, show in this year's figures at £56, and this increase of £16 consists chiefly of library binding £10, and an advance in general printing of £4.

Wild Flower Exhibition. Some anxiety was felt respecting the financial success of this function, considering that it was being held at the St. Kilda, instead of the Melbourne Town Hall. Though ticket box sales show a shrinkage of £19 (or 380 fewer tickets purchased than on the last occasion in the city), the sale of plants, flowers and refreshments brought in £15 more. While the cost of the hall was £10 lighter, other expenses increased by £16. A summary of the position is as follows:—

	Last Year	This Year
Gross Takings	£169	£166
Expenses	50	56
Net proceeds ..	£119	£110

of which £55 was handed to the Bush Nursing Association, leaving a profit of the same amount to the Club.

The total liquid funds of the Club have increased during the financial year by £15/8/9, showing still a dependance upon the Show for funds to lay out in other directions.

FIELD NATURALISTS' CLUB OF VICTORIA.

STATEMENT OF RECEIPTS AND EXPENDITURE FOR TWELVE MONTHS ENDED 30th APRIL, 1926.

Receipts.

To Balance in Bank on 1st May, 1925			£17 14 5
,, Subscriptions—			
Town Members			
Current year	£138 10 0		
Arrears	24 2 6		
In advance	6 10 0		
Country Members:			
Current year	22 17 6		
Arrears	3 5 0		
In advance	1 17 6		
Associate Members	1 10 6		
		£198 13 0	
"Victorian Naturalist"—			
Subscriptions	5 4 0		
Cash Sales	30 5 10		
Reprints Charged	2 2 6		
		37 12 4	
,, Donations to Publishing Fund		3 1 0	
,, Interest from Savings Bank and War Loan Bond		5 9 5	
,, Sale of Club Badges		0 2 9	
,, War Loan Bond withdrawn on maturity		20 0 0	
,, Plant Census Account—			
Sale of Books in year		24 4 10	
,, Wild Flower Exhibition, September, 1925—			
Ticket Sales	28 3 0		
Cash at Doors	63 17 0		
Sale of Plants, Flowers and Refreshments	74 8 9		
		166 8 9	
			454 12 1
			£473 6 6

Expenditure.

By "Victorian Naturalist"—		
Printing	£180 12 6	
Illustrating	28 0 0	
Wrapping, Despatching and Postage	27 8 5	
Reprints—Free	9 0 0	
Reprints—Charged	5 8 6	
		£250 9 5

By General Printing		15 8 9	
,, Library Account— Purchases and Binding		16 9 9	
,, Rent of Hall and Fee to Caretaker		13 10 0	
,, Postage, Advertising, Bank Charges, Insurance, and Sundries		10 12 10	
,, Plant Census Account		1 6 0	
,, Wild Flower Exhibition, September, 1925—			
Hire of St. Kilda Town Hall	8 8 0		
Purchase of Plants and Flowers	18 6 1		
Printing and Advertising	13 19 6		
Cartage, Freight and Sundries	16 13 0		
Donation to Bush Nursing Association	55 0 0		
(Balance retained in Funds of Club £54/2/2)			
		112 6 7	
,, Transfer to State Savings Bank		25 0 0	
			445 3 4
,, Balance in Bank and cash in hand on April 30, 1926			28 3 2
			£473 6 6

STATEMENTS OF ASSETS AND LIABILITIES ON 30th APRIL, 1926.

Assets.

Arrears of Subscriptions, £87/7/6, estimated to realise		£50 0 0
E.S. & A. Bank Balance	£28 2 11	
Cash in Hand	0 0 3	
		28 3 2
State Savings Bank		175 0 0
Library and Furniture (Insurance Value)		130 0 0
Mounted Badges on hand		1 2 6
Plant Census Account (difference between cost and sales of books)		145 5 10
Accounts owing to Club—		
For Advertisements in "Victorian Naturalist"	£5 0 0	
For Reprints charged	4 14 0	
		9 14 0
		£539 5 6

Liabilities.

Subscriptions paid in advance	£9 2 6
Balance of Char-a-banc Fund	5 6 0
Outstanding accounts	34 4 2
	£48 12 8

Audited and found correct on June 8, 1926.

C. A. LAMBERT }
H. HUGHES } Hon. Auditors.

A. G. HOOKE,
Hon. Treasurer.

The statement was received and adopted on the motion of Messrs. F. Pitcher and J. A. Kershaw.

ELECTION OF OFFICERS AND COMMITTEE.

The following (unopposed) were declared duly elected:—President: Mr. E. E. Pescott, F.L.S.; Vice-Presidents: Messrs. A. E. Keep and P. R. H. St. John; Hon. Treasurer: Mr. A. G. Hooke; Hon. Librarian: Dr. C. S. Sutton; Hon. Editor: Mr. C. Barrett, C.M.Z.S.; Hon. Assistant Secretary and Librarian: Mr. H. B. Williamson, F.L.S.

A ballot was taken for the office of Secretary, and resulted in the election of Mr. L. L. Hodgson.

The following were elected members of the Committee as a result of a ballot: Messrs. J. W. Audas, F.L.S.; F. Chapman, A.L.S.; C. Daley, B.A., F.L.S.; J. A. Kershaw, and C. Oke.

Mr. Pitcher referred to the valuable services of Mr. Hooke, as Hon. Treasurer, and said that the thanks of the Club were due to him.

Mr. A. E. Keep moved that the thanks of the Club be extended to Mr. Oke for his valued services as Hon. Secretary during the past five years. Seconded by Mr. A. J. Tadgell, and carried unanimously.

PAPER.

At this stage Mr. Coghill vacated the chair, and Mr. Pescott assumed office. Mr. Pescott thanked members for electing him as President for the ensuing year. He also paid a tribute to the work of the retiring President, and moved that the thanks of the Club be tendered to Mr. Coghill, and the officers and committee for their past services. Mr. Keep seconded the motion, which was carried with acclamation.

Mr. Coghill returned thanks on behalf of himself, his fellow officers and the Committee, and specially mentioned Mr. Barnard, who was retiring from office after 42 years of service.

Mr. F. Pitcher moved that a hearty vote of thanks be accorded to Mr. C. Barrett, the Editor, for his good work in connection with "The Victorian Naturalist." Seconded by Mr. Williamson and carried unanimously.

"The Amoebae—Their Structure, etc." by Mr. J. A. Ross. In the absence of the author this paper was read by Mr. Stickland.

EXHIBITS.

By W. H. Nicholls: Eight water-colour drawings of Australian orchids. Among these were *Prasophyllum intricatum*, Stuart; *Pterostylis ophioglossa*, *Pt. decurva*, Rogers, and *Pt. truncata*, Fitz. Photographs of the White Bog Orchid, *Burnettia cuneata*, collected at Athlone, October, 1925. Many details, in water-colour, of rare species, including two undescribed species, now in the hands of Dr. R. S. Rogers, *Prasophyllum Hartii*, from Bairnsdale, and *Caladenia alpina*, Alps and Baw Baws, *Prasophyllum fusco-viride*, and others.

By Mrs. E. Coleman: *Pterostylis grandiflora*, R.Br., Belgrave, 13/6/26.

By Rev. Geo. Cox: Seeds of Mango-tree, found by members of the Mornington Naturalists' Club, washed up on local beaches. Mr. P. R. H. St. John kindly supplies the following information:—"Seeds of Mango-tree, *Mangifera indica* (Linn.), Family—Anacardiaceae, Habitat—East Indies, Malaya, etc. This tree yields the Mango, a large drupe, variable in colour and size, of a perfumed and sugary-acid taste, becoming purgative when eaten to excess, but which is one of the best tropical fruits. Its bitter aromatic root is used medicinally. We have one small tree in cultivation at Melbourne Botanic Gardens."

Mr. J. Searle: (1) Several stained and mounted specimens of Amoeba, showing extended pseudopoda, nucleus, ingested diatoms, etc. (2) T. S. of pinnule of a "Feather Star" (one of the Crinoids), showing ovary, axial, nerve-cord, radial nerve, ambulacral vessel, etc.

Mr. E. E. Pescott, F.L.S.: Flowering specimens of Coolgardie Gum (*Eucalyptus torquata*), and Bushy Heath-myrtle (*Thryptoccene Mitchelliana*); also aboriginal stone weapon.

Mr. H. B. Williamson, F.L.S.: Specimens of species, illustrated in Victorian Ferns, Part vi. Flowering specimens of the only yellow species of *Brachycome* (*B. chrysoglossa*, F. v. M.)—Golden Daisy—collected by Mr. J. Williams, at Donald.

Mr. C. Oke: Vegetable-caterpillars.

Mr. C. Daley, B.A., F.L.S.: Case moths.

Mr. V. Miller: Aboriginal grinding stone, from Mallacoota.

Mr. J. A. Kershaw: Young Tiger Snake, double-headed.

Greenhood Orchids of Victoria

By W. H. Nicholls.

Part 1.

The *Pterostylis* group of terrestrial orchids is probably the most interesting, if not the most popular, genus of all our Orchideeæ. The Greenhoods are not beautiful, when compared with some of the other genera or families, notably *Thelymitra* and *Caladenia;* but some of the species are attractive, and dainty, notably *grandiflora, revoluta, falcata, decurva* and *alpina,* each with its own peculiar charm.

These plants are widely known as Greenhoods, but "Hooded" orchids would be far more appropriate, as a fair number of the species are more brown than green, as *vittata, pedunculata, rufa, Mitchellii, truncata, pusilla.* It must be remembered that the *Thelymitras* once were called Hood-orchids; now they are known as Sun-orchids. Almost all of our Greenhoods have a sensitive labellum, in many of them it is extremely irritable, a mere touch or a light breeze being sufficient to cause disturbance, which is recognised as essential for the fertilization of the species.

The pollinary mechanism is most intricate in many Greenhoods, but too little attention has been paid to the seedlings of any species of this group; they have been found no doubt, and it is probable that plants from seed are far more abundant than is usually supposed; as witness the enormous number of very small plants seen in some seasons. With the very inadequate knowledge we at present possess, it is hard to say whether dissemination or root-multiplication plays the greater part in the propagation of the various species.

The majority of those species usually found in damp places, or in districts where soil situations, albeit not damp, still seem conducive to the plants' well-being, have comparatively small tubers. An examination of those occurring in somewhat dry places reveals their tubers as very large, or, if of small size at some distance beneath the surface. Some investigations recently made on the Keilor basaltic plain support this view. The little tubers of four plants were found to be between 4in. and 6½ inches below the surface. Two species, representing the large-tubered growths of arid country are *Pt. rufa,* B., and *Pt.*

mutica, Br. Their tubers often may be found with the extraordinarily large diameter of 1¼ inch in the widest part!

In Victoria we know, at present, 29 valid species. I say at present, as hardly a year goes by, without some new orchid being discovered, a *Pterostylis* or member of another genus, such, if not new to science, will at least be new for the State. *Pt. decurva*, Rogers, and *Pt. truncata*, Fitz, are two recent finds, the former a species new to science, and the latter new for Victoria. The first-named was found during the Summer of 1920, on the Dandenong Ranges; the latter, on the You Yangs Range, as recently as 1924. Altogether, 11 species have been added since 1889. It is probable that *Pt. ophioglossa*, Br., a most beautiful, almost copper-coloured form, will be added to our list ere long. It occurs in the coastal districts of New South Wales, in those situations favoured by its close relation *Pt. concinna*, Br.

Pterostylis unquestionably is an Australian type, but not endemic. See "The Distribution of Australian Orchids," by Dr. R. S. Rogers, *Trans. Roy. Soc., Sth. Aus.*, Vol. xlvii, 1923, where the following interesting table is given:—

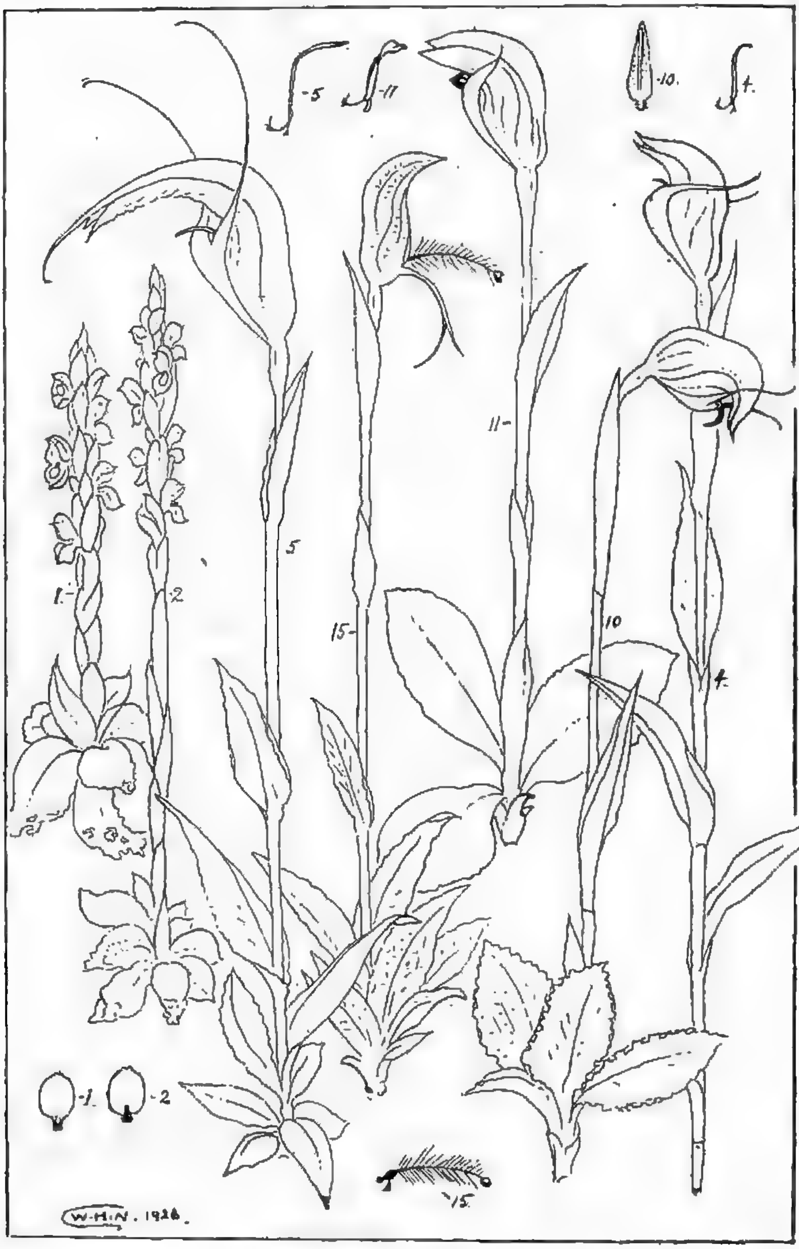
Pterostylis R.Br. Australia, 43. New Zealand, 12 (of which eight are endemic, and four common to Australia). New Caledonia, four (of which one is endemic, and three in common with Australia). New Guinea, two (endemic). Total, 54, of which 50 are endemic.

The present totals for the States of the Commonwealth are as follows:—Victoria, 29; New South Wales, 28; Queensland, 16; South Australia (including Northern Territory), 22, Western Australia, 10, Tasmania, 19.

For convenience we will not adhere to the alphabetical order of the Census, but, as far as possible, describe seriatim the members of groups that have many points in common.

Pt. mutica, R.Br. (Fig. 1). (Docked).

The Midget Greenhood is a plant of very variable habit; though quite sturdy and of low growth in Victoria, it reaches to a height of over 12 inches in New South Wales, while Dr. Rogers, in *The Flora of South Australia*—Part 1, page 152 (1922), records it as a small, slender species, about 4 inches in height. It is now many years since I made the acquaintance of this plant. It was on the Stony Creek, just off the Melbourne-Geelong Road, beyond West Footscray, among the rocks, in the company of our most beautiful violet (*Viola betonicifolia*) and the Adder's Tongue Fern (*Ophioglossum*), that it grew in numbers. The plant is wholly green, with many small flowers, usually between 7 and 14; and the basal leaves somewhat faded at time of flowering. It



1—*Pt. mutica*, Br. 2—*Pt. cycnocephala*, Fitz. 4—*Pt. alpina*, Rogers. 5—*Pt. falcata*, Rogers. 10—*Pt. nutans*, Br. 11—*Pt. curta*, Br. 15—*Pt. barbata*, Lindl.

NOTE.—The labella are marked with figures corresponding to the species.

Plants only two-thirds natural size

is at once recognised by the labellum (which is very sensitive) having the appendage pointing inwards.

All Eastern States, including South Australia and Tasmania. Flowering time, August-November.

Pt. cycnocephala, Fitz. (Fig. 2). (Swan-headed)

The Swan Greenhood is a plant very similar to *Pt. mutica,* but, in this State at least, it is much more slender, taller, and of a richer green. Recognised also by the labellum appendage, which, in this case, points outwards. Found, like *Pt. mutica,* in open grassland, or open forest country. Victoria, New South Wales, South Australia, and Tasmania. —September-October.

Pt. parviflora, R.Br. (Fig. 3). (Small flowered).

The Tiny Greenhood. The labellum and column of this species are really beautiful. There are three forms: coastal, inland, and (in Tasmania) alpine. The coastal form is very slender, rarely more than 7 inches in height, and the flowers, which are few, are of pale colour. The inland form often is tall, up to 23 inches; often with many flowers (up to 13 collected by the writer), with dark green striae, other markings being yellowish-brown or red. The alpine form, which is known in Tasmania as variety *Pt. aphylla,* I have received from Tasmania; this blooms in December, and is quite stout, rather fleshy, very short, with few flowers (1-2). The finest specimens I examined came from Everton, in the N.E. of Victoria (June). The plants were tall and the individual flowers were almost ½-inch in length (7-16th's), minus the ovary. Firmly striped with green and rusty-brown markings. At the base of the stem many rosettes of leaves are clustered. Plant rarely with basal leaves.

All States (Western Australia excluded). Tasmania (lowlands). Flowering March-June; South Australia, March-June and November-December; Tasmania (alpine) December.

Pt. alpina, Rogers. (Fig. 4). (Alpine).

The Alpine Greenhood. A slender, glabrous species, varying in height from 5 inches to 20 inches. It has scattered stem leaves, usually 4 or 5, and the single, large flower is softly coloured in green and white. Usually solitary, but sometimes in scattered or compact groups, more especially in alpine regions (Baw Baws). Strange to say, this plant was once thought to be a variety of *Pt. falcata,* Rogers, when the latter was mis-named Pt. cucullata, Br. But there is very little resemblance to that particular species. Two noticeable features *of Pt. alpina* are the soft blending of green and white in the neatly fashioned flower, and the pronounced backward sweep of the lateral sepals. This is not strictly an alpine plant, it occurs in many parts of the State, usually in damp forest country, and along the banks of streams. It was sent to me recently from Tasmania, by the Ven. Archdeacon Atkinson, of Penguin, who discovered it in dense, almost impenetrable country on the Hellyer River. This is the first record of this species having been found in that State. Its discovery in Victoria, many years ago, was due to the untiring efforts of Mr. C. French, jnr.

Victoria, Tasmania—September-February. (Feb., Baw Baws).

Pt. falcata, Rogers (Fig. 5). (Sickle-shaped galea).

The Sickle Greenhood. This orchid is well-named, and represents our largest type of Greenhood; the largest diameter of several flowers received last November was 3¼ inches (including ovary); these came from the Grampians. All the segments are sickle-shaped. The caudae of the lateral sepals in the freshly opened flower often assuming a falcate position; but, as in some other species, the position of these segments changes somewhat, eventually assuming a reflexed position as in *Pt. alpina*, Rogers. Plant usually about 8 inches in height, basal leaves, ovate lanceolate rarely rosulate; stem bracts, 2-4 lanceolate. Flower, green and white, with some brown markings on the segments. Common in many parts of the State, confined to swampy, low-lying ground, and other damp situations.

Victoria, Tasmania—October-January (January, Tas.)

Pt. obtusa, R.Br. (Fig. 6.) (Obtuse labellum).

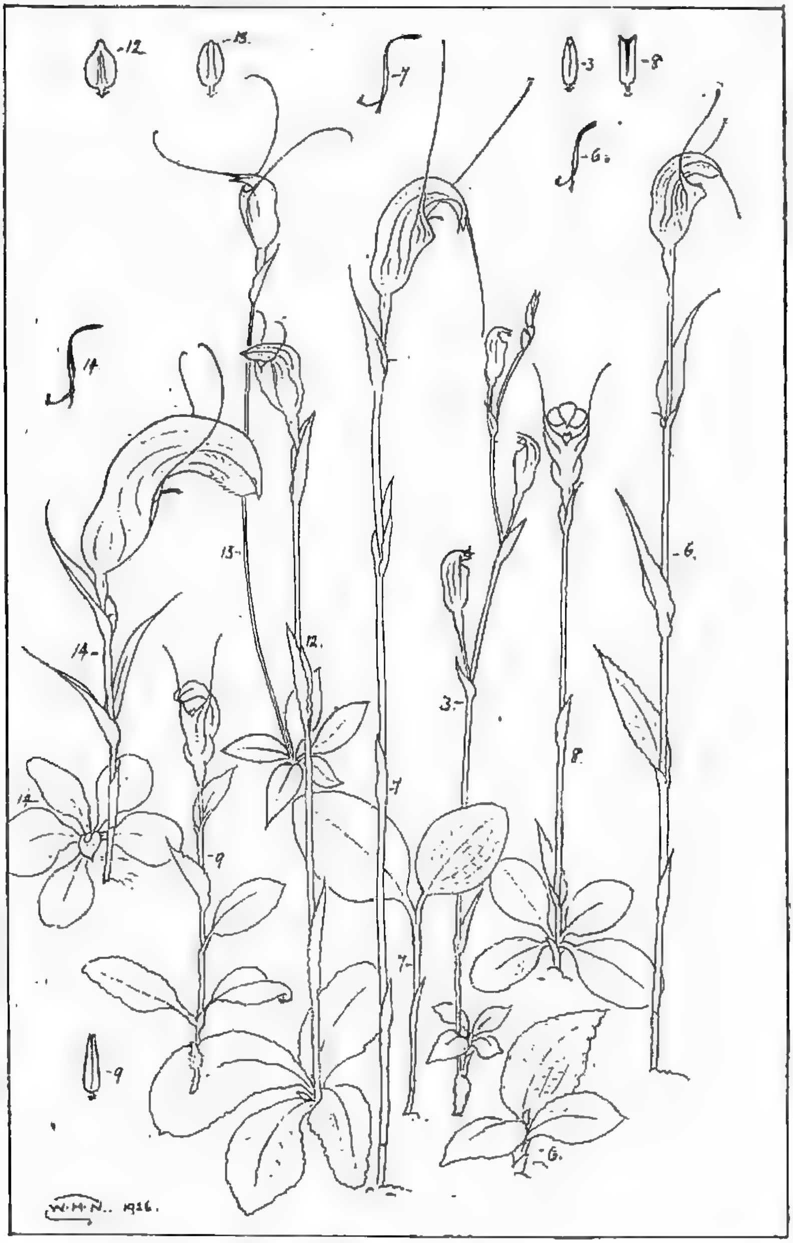
Blunt-tongue Greenhood. A neat and dainty species, 5 inches to 10 inches in height, normally single-flowered; usually, green with brown markings, variable in minor details, but distinguishable by short, obtuse *labellum not protruding beyond the sinus.* Radical leaves quite unlike those of *Pt. decurva*, Rogers. On rocky hillsides around Fern Tree Gully, Dandenong Ranges. Fairly numerous.

All States (excluding Western Australia).—March, April and May

Specimens of this plant received from New South Wales (Martin's Creek, near Paterson), were almost wholly pale green. The lip much more projecting and the radical leaves on very long slender petioles, as opposed to the short, almost sessile, type of the Victorian form.

Pt. decurva, Rogers. (Fig. 7) (Decurved apex of galea)

The Graceful Greenhood. Our most graceful species, often confused with *Pt. obtusa*, Br., which it much resembles; but in *decurva*, the *labellum protrudes conspicuously beyond the*



3—*Pt. parviflora*, Br. 6—*Pt. obtusa*, Br. (and radical leaves). 7—*Pt. decurva*, Rogers (and radical leaves). 8—*Pt. concinna*, Br. 9—*Pt. toveyana*, Ewart. 12—*Pt. pedunculata*, Br. 13—*Pt. pedoglossa*, Fitz. 14—*Pt. truncata*, Fitz. (and Radical leaves).

Plants only two-thirds natural size

sinus; there are much longer extensions of all five segments, and the plant flowers in the summer months. Collected at Fern Tree Gully (1920) by A. N. Burns, and, like *obtusa*, to be found on many hills thereabouts. It also occurs in Tasmania, where it has, until lately, been taken for *Pt. obtusa*, Br.

Victoria, Tasmania—November-January.

Pt. concinna, R.Br. (Fig. 8). (Neat).

The Trim Greenhood is a common gregarious species, from 2 inches to 12 inches in height, confined to the coastal districts, and a few damp gullies inland. (Eltham). It is at present our only existing representative with a bifid labellum (see *Pt. Toveyana*). The large assemblages of this plant, seen during the winter months, under the Tea-tree lining the shores of Port Phillip Bay, and elsewhere, are most interesting to orchidologists. Dr. Rogers records this species as being very rare in South Australia.

All States (excluding Western Australia)—June-August.

Pt. Toveyana, Ewart. (Fig. 9). (After Mr. J. R. Tovey).

The Mentone Greenhood is under 5 inches in height, resembles a small *Pt. concinna*, but has stem leaves (*P. alata* is supposed to be one of its parents). It was first found at Mentone, 1907, by the late Mr. J. R. Tovey. It is easily distinguished from *Pt. concinna*, Br., by its much smaller habit, by the presence of ovate or oblong stem leaves, and the longer labellum, which is very slightly bifid. It has not been found in Victoria now for many years. The original locality has not been protected, and tender plants, growing in open spaces in holiday resorts, are bound to suffer. As recently as 1924, I received specimens from Tasmania of what was supposed to be a form of *Pt. concinna*, Br., but examination showed that they were identical with the Mentone Greenhood. This species is widely distributed throughout the Island State, but is not regarded as common, even there.

Victoria, Tasmania—May-July.

Pt. nutans, R.Br. (Fig. 10). (Nodding).

The Nodding Greenhood. Normally single-flowered, green with rusty markings at the tips of the segments. It is similar to our commonest and best known species. The plants, which are from 3 inches to 15 inches in height, favour sheltered positions, chiefly under trees, in damp situations. The curious nodding habit of the flower makes it a general favourite, and it stands alone as a typical Greenhood. Specimens gathered at the foot of the Dandenong Ranges (between Boronia and Bayswater), and near Wattle Glen (1923), were from 12 inches to 15 inches in height, and very sturdy. In some specimens the rosulate leaves at the base were 5 inches in length (including petioles).

Common, all States, excepting South Australia, where it is rather scarce—September-November.

Pt. curta, R.Br. (Fig. 11). (Shortened lateral sepals).

The Blunt Greenhood also is a very common species, from 4 inches to 11 inches in height, with radical rosette at the base of the stem. The chief features of the flower, are the blunt or shortened appearance of the galea and sepals. The large red-brown labellum, which is curiously twisted to one side, and the pale colour of the flower. In New South Wales two forms occur, one similar to our own species, and another much smaller and somewhat uncommon.

All States (excluding Western Australia)—August-November.

Pt. pedunculata, R.Br. (Fig. 12). (Stalked).

The Maroon-hood blooms at the same time as *Pt. nutans*, Br., with which it is often found growing; it has an exceedingly slender stem, and, sometimes, *large*, basal leaves. The single flower is very small, and the prevailing colour usually dark-brown or red, is restricted to the forward half of the flower. The labellum is bluntly ovate in shape. Fairly numerous in many parts of the State.

All States (excluding Western Australia)—September-November.

Pt. pedoglossa, Fitz. (Rudder-shaped labellum). (Fig. 13).

The Tailed Greenhood. A small, fragile, and rather dainty plant 2-5 inches in height, almost wholly green; to be sought in our heathland thickets, where usually it is well hidden. The delicate prolongations of the paired sepals, being erect, give height to the plant and add to the attractive appearance of the slender flower. Quite large colonies are common. Frequenting such secluded places, this species, perhaps, is not nearly so rare as is usually supposed to be. Always an Autumn flowerer.

Victoria, New South Wales and Tasmania—March and April, the best months.

Pt. truncata, Fitz. (Fig. 14). (Cut short).

The Brittle Greenhood, is a remarkable species, easily distinguished from all others by the enormous expansion of the fore-part of the galea, by the slight "curta" twist to the labellum (in the mature flower), and the dwarf habit; remarkable also for such a large flower. It favours sheltered positions, chiefly among Rock Fern (*Cheilanthes*), and Snowy Mint bush thickets, or among rocks. The succulent form, which is exceedingly dainty, is plentiful during very wet seasons. It was first recorded in Victoria in 1924, from the You Yangs Range, and subsequently from the Brisbane Range, also from Tottenham and Sunshine. The vernacular, "Brittle Greenhood," is an apt one, the galea being unusually fragile. In June last I received several fine specimens of this orchid from the Paterson Valley, N.S.W. (Rev. H. M. R. Rupp.) These differ from the Victorian type only in minor details.

Victoria, New South Wales—April-June.

Pt. barbata, Lindl. (Fig. 15). (Bearded)

The Bearded Greenhood is a grotesque type, usually under 12 inches in height, almost wholly green. It derives its specific name from its long, hairy labellum, which depends directly from the front of the flower; the hairs are yellow, and the tip is adorned with a red knob; which, under the magnifying glass, is a beautiful object. This is a very leafy species, with the leaves, in fact, the whole of the plant, richly veined.

Widely distributed all States (excluding Queensland).—September and October, its best months.

EXCURSION TO MT. EVELYN.

Twelve members and friends journeyed to Mt. Evelyn on Monday, June 7, and were met, on arrival of the train about 10.30 a.m., by Mr. L. Hodgson, who, in the absence of Mr. G. Coghill, acted as leader The party proceeded towards Wandin, keeping close to the railway line; but, most of the country having been swept by bush fires last summer, little of botanical interest was observed. At Stringy-bark Creek, a halt was made. Some of us rambled in the neighborhood, others watched a friendly Yellow Robin, several Thornbills, and Honeyeaters, which were extracting nectar from the blossoms of Eucalypts.

Some distance down the creek, we reached a strip of unburned country. The main Warburton road was followed in the direction of Lilydale, and a deviation was then made in the bush, which had here escaped the fires. Good specimens of pink and white *Epacris* were gathered. The following orchids were noted during this excursion:—*Caledenia Menzesii* (leaves and buds), *Caledenias* (leaves and buds), *Glossodias* (leaves and buds). The only orchid in flower observed was *Pterostylis parviflora* (Greenhood).—L. L. HODGSON.

Extinct Vertebrates from Beaumaris

BY F. A. CUDMORE.

Along the Brighton to Beaumaris coast on any warm summer day, you will see hundreds of people bathing in the shallow water. They have no fear of sharks, which are seldom seen there, and have hardly ever been known to attack swimmers. Yet once, not so long ago, as geological time goes, sharks of many different species and sizes abounded in this area; proof that this was so can be obtained at the base of the cliffs at Beaumaris, where a nodule bed of Kalimnan (Lower Pliocene) age contains large numbers of their teeth, also occasional vertebræ, besides the teeth and bones of other fishes, whales and dolphins.

The best exposure of the nodule bed is just west of the boatsheds, but it is covered by water, except at low tide. Collectors should note that southerly and westerly winds prevent the tidal waters flowing out freely from the Bay, and it is useless to visit Beaumaris when these winds are strong. The area exposed at low tide should be searched carefully and systematically. Most of the teeth will be found loose among the shingle, having been worn out of the soft rock by the scour of the tides—therefore, turn over all pebbles—others still embedded can be easily extracted by means of a hammer and chisel.

The body of a shark is composed mainly of gristle, or cartilage, the only parts hard enough to be preserved as fossils being the teeth and vertebræ; the latter also are found at Beaumaris. The dentine, or enamel, of these teeth is well preserved, retaining a high glaze—I am often asked whether I have polished my specimens—while the bases, or roots, though more or less impregnated by mineral matter, still show the original bony structure. The enamel varies in colour from brown to grey green, and occasionally to blue, while the bases are light brown and dark brown. These fossils often show evidence of having undergone a considerable amount of rolling on the old sea floor, while some may have been derived from an older bed before being buried in the nodule band; sometimes the base is missing, the tooth has been split or the enamel has been flaked off. To-day after the lapse of ages the sea is continuing this process.

SHARKS.

Teeth of the still existing Great White Shark (*Carcharodon carcharias* Linné), and of two extinct species of the same genus (*C. megalodon*, Charlesworth, and *C. auriculatus*, Blainville sp.) have been obtained from this locality. This ocean-dwelling "man-eater" reaches a large size, in the tropics, being frequently as much as 30 feet in length; it is seen at times in Port Phillip, but luckily dislikes shallow water. Its teeth are triangular in shape, with both sides serrated; in the case of the largest pair of jaws in the British Museum they are 2 inches long, but those of *C. megalodon* sometimes measure 6 inches in length. Ray Lankester has shown that the latter species probably attained a length of 100 feet. Picture this giant attacking one of the whales, its jaws gaping at least 6 feet apart and revealing those rows of reserve teeth, so characteristic of the shark tribe! Specimens of the living species, and of the fossil teeth, may be seen in the National Museum.

The Blue Pointer sharks are represented by two genera, *Isurus* and *Lamna*. No fewer than five species of the former are present, the teeth being spear-shaped, with sharp cutting edges. I have specimens of *I. retroflexus*, Ag. sp., and the common *I. hastalis*, Ag. sp., that are 3 inches in length. The former is easily distinguished by its double-pronged base and more slender, bent tooth. The three species of *Lamna* are all smaller and rare. Abundant, also, in those old seas, were the Bull-dog sharks (*Odontaspis*), four species having been found. These sharks, like their descendants in Victorian waters to-day, were armed with very pointed, long, slender teeth, which are prized by collectors. Often they show small denticles on the base, on either side of the main point. The living representatives of this family (*Lamnidae*) provide great sport for the big-game-fish anglers of New Zealand.

The Grey and the Blue Nurse sharks add three more species to our list. *Carcharias collata*, Eastman, was described from fossils found in Maryland, U.S.A., Beaumaris apparently providing its first occurrence elsewhere. *C. victoriae*, Chapman and Cudmore, was discovered at Beaumaris, and has been collected also at Table Cape, Tasmania; while *C. aculeatus*, Davis sp., a New Zealand form, since found at other Australian localities, was alive in the still more ancient Balcombian and Janjukian seas. All these are small and easily overlooked.

Three species of Tiger shark (*Galeocerdo*) are present. These teeth have a broad base, with a point which is curved over to one side at an angle of 45 degrees. The natives of the

Gilbert Islands, in the Pacific, bore a hole in the base and barb their spears by lashing on teeth; examples of these weapons can be seen in the National Gallery. The Grey shark (*Notidanus*) is known from Australian rocks by only one specimen; this Beaumaris find has comb-like teeth, mounted on a large bony base.

Curious oval, bean-shaped teeth are plentiful; they are the crushing teeth of the Port Jackson or gummy shark (*Cestracion*). Ranging in size up to an inch in length, they were set closely together in the mouth to form a palatal surface for crushing shellfish and similar food. There are four species in this bed, also an allied genus (*Strophodus*). A large form (*C. cainozoicus*, Ch. and Pr.) is common, but the others are either small or rare, two of them being previously unknown outside New Zealand. The occurrence of these sharks in the Tertiary rocks of Australasia is of interest, since in Europe they existed into the first epoch of the Tertiary, when the genus migrated to the south, surviving to-day only off the Australian coast.

The teeth of the Saw sharks (*Pristiophorus*) had been found previously in New Zealand, but it was not known to what sort of fish they belonged; their discovery at Beaumaris enabled Mr. Chapman, who has described a number of the forms here mentioned, to define their relationship, by comparing them with those of the living Victorian species. They came from the rostrum, or saw, which projects from the head of these fishes; one oral tooth has also been found, and it is interesting to note that New Zealand is the only other country whence one has been reported. This species completes the record of 28 sharks known from these rocks; it should be noted that fully half of them have a widespread distribution in other countries, others being found in New Zealand.

Other Fishes.

Here, too, are the rostral teeth of the Saw-fishes (*Pristis*), their first occurrence in Australasia. *P. cudmorei*, Chapman, so far only known from Beaumaris, proved to be more closely related to the recent Mediterranean species than to the form now living in Victorian waters. A more curved form of rostral tooth (*P. recurvidens*, Ch. and Cu.) was discovered here, and has since been collected from the Janjukian of South Australia and Tasmania; the oral teeth are unknown. All these teeth are less than an inch in length.

Next we have a remarkable type in the crushing palatal teeth of two species of Eagle Rays (*Myliobatis*), one being recorded only from Beaumaris. In form they resemble flat, narrow bars, bearing underneath deep, closely set, transverse grooves, giving them a very comb-like appearance. The living ray bears a sharp-pointed, serrated spine in its whip-like tail, and in the tropics the poisonous wound it is capable of inflicting has sometimes caused the death of human beings; fragments of a similar spine are uncovered at times at this locality.

Another striking occurrence is provided by the tusk-like teeth of two species of the Elephant Fish (*Edaphodon*). This genus had long been extinct elsewhere, but survived locally until the Kalimnan period. Only one specimen of *E. mirabilis*, Ch. and Cu., probably the largest species known, has been found, and neither species has been collected yet outside the Beaumaris-Black Rock area.

A palate occasionally found is conspicuous by reason of its flat, mosaic-like surface, due to many small teeth crowded side by side, the general shape being roughly triangular; it belongs to one of the Wrasses (*Nummopalatus*). The palatal jaws of the Porcupine Fish (*Diodon*), so often seen caught in fishermen's nets, are quite common; being formed of layers of plates, the shingle soon reduces them to fragments. Two species of this spiny fish are living in the Bay.

Whales, Etc.

The cliff near the point has produced a whale's rib 6 feet in length. This specimen, to be seen in the National Museum, indicates a whale about 40 feet in length. The teeth of two genera of whales (*Physetodon* and *Scaldicetus*) have been discovered in the nodule bed, which is rich in cetacean bones; rib-fragments, vertebrae and ear-bones (*Cetotolites*) all occur. The dolphins are represented by the teeth and ear-bones of *Steno cudmorei*, Chap., this being apparently the first record of this genus as a fossil, though the living species is found in the Atlantic, Indian and Pacific oceans.

Kangaroos.

Two specimens of the teeth of extinct marsupials have been collected from the shingle; probably they had been derived from the younger non-marine beds higher up the cliffs. One was a tooth of the gigantic kangaroid marsupial, *Palorchestes*, and the other was a jaw containing two molars which has been referred to the giant kangaroo, *Sthenurus*.

I had the pleasure of finding 14 of these species here, for the first time, six of them being new to science and five of the remainder being previously unrecorded in Australia. I hope to find others, since it is certain that we do not yet know all the varied vertebrate fauna of those old seas, and that many prizes remain to reward fossil collectors who carefully search the strata at Beaumaris.

LIST OF VERTEBRATES KNOWN FROM BEAUMARIS.

MAMMALS.

MARSUPIALS—

Palorchestes.
Sthenurus (?).

CETACEANS.

WHALES—

Physetodon baileyi, McCoy.
Scaldicetus macgeei, Chapman.

DOLPHIN—

Steno cudmorei, Chapman.

SHARKS.

Notidanus jenningsi, Chapman and Pritchard.
Cestracion cainozoicus, Chapman and Pritchard.
C. coleridgensis, Chap.
C. novo-zelandicus, Chap.
C. longidens, Chapman and Cudmore.
Strophodus eocenicus, Tate.
Galeocerdo davisi, Ch. and Pr.
G. latidens, Agassiz.
G. aduncus, Ag.
Carcharias collata, Eastman.
C. victoriae, Ch. and Cu.
C. (*Prionodon*) *aculeatus*, Davis sp.
Odontaspis contortidens, Ag.
O. incurva, Davis sp.
O. attenuata, Davis sp.
O. cuspidata, Ag. sp.
Lamna apiculata, Ag.
L. compressa, Ag.
L. crassidens, Ag.
Isurus hastalis, Ag. sp.
I. retroflexus, Ag. sp.
I. eocaenus, A. S. Woodward sp.
I. minutus, Ag. sp.
I. desorii, Ag. sp.
Carcharodon megalodon, Charlesworth.
C. auriculatus, Blainville sp.
C. carcharias, Linne sp.
Pristiophorus lanceolatus, Davis sp.

SAW-FISH, RAYS, &c.

Pristis cudmorei, Chap.
P. recurvidens, Ch. and Cu.
Myliobatis moorabbinensis, Ch. and Pr.
M. affinis, Ch. and Cu.
Edaphodon sweeti, Ch. and Pr.
E. mirabilis, Ch. and Cu.
Nummopalatus depressus, Ch. and Pr. sp.
Diodon formosus, Ch. and Pr.

Lyre-birds at Sherbrooke

By A. G. Hooke.

On account of the reservation, some years ago, of a few square miles of country in the Dandenong Ranges, Sherbrooke remains an area of natural forest, and let us hope that it will long be the haunt of the Lyre-bird (*Menura novaehollandiae*). The rich volcanic soil of the locality, combined with the moist hill-climate, induces the growth of dense thickets of scrub among the timber. These provide shelter from both weather and the encroachment of humanity; while food exists in plenty in the chocolate loam, wtih its covering layer of decayed leaves, and in the mouldering moss-grown logs, all abounding in the insect life, small crustaceans, etc., on which lyre-birds feed.

Among the factors controlling the distribution of *Menura* rainfall is, I think, not the least. The larger view of this is seen in the restriction of the species almost entirely to the highland belt that runs parallel to the east and south-eastern coast of Australia, a belt distinguished from adjoining lowland country alike by altitude and rainfall; and consequently upon the latter by denser and richer vegetation, providing the environment in which the lyre-bird thrives. The controlling influence of rainfall, in a narrower sense, is apparent within the occupied region by a temporary effect; for, during a dry period in the summer, it has been observed that the usual feeding-ground is generally deserted, apparently being too dry for successful foraging, and larger numbers of lyre-birds than usual, are to be seen close to the streams, scratching up the moist earth by the water's edge, and even moss from stones of the creek. Also, fear seems to take second place to hunger.

In the Dandenongs, where the annual rainfall approaches 60 inches and is well distributed, these trying conditions do not apply often, or for long; and it is usual for the soil to remain in a sufficiently moist state for a livelihood to be obtained by the birds in any portion of the reserve. After rain, or during a light shower, the keenness of *Menura* in the quest of food indicates, it is thought, the stimulating into activity of the prey, the moist conditions encouraging it to come towards the surface of the ground, an action frequently leading to destruction, and one seemingly expected by the devourer.

It is clear that the lyre-birds in this forest live in colonies, which change their locality from time to time, probably at intervals of some years. At the present time there is one such group containing 11 at least, another of seven, and about four other groups in more inaccessible places. Probably an instinct of protection leads to communal life; the number of birds associating, and the locality frequented being determined by the quantity of food readily obtainable.

A dozen years ago it was a matter of some difficulty, except to an experienced observer, to catch more than a fleeting glimpse of the birds; but, as the Sherbrooke forest has become more frequented by people, so these protected birds, finding themselves unmolested, are much less shy of being quietly observed. On one occasion recently a bird that had been watched at close range by two gentle observers, and was slowly departing, actually returned on being spoken to in tones of soft persuasion, and remained scratching about the same spot, for some minutes longer. Instances of intelligence in other directions are not wanting.

A lyre-bird, which one day we were watching, tried to overturn a small piece of a log, which, having a convex undersurface, "gave" when he touched it. Not succeeding, he left it, only to return in a couple of minutes to make another attempt. This time, after a brief deliberation, standing well back, he seized the further edge of the log with the claws of the right foot and pulled with a will. Two or three times it slipped from his grasp when nearly overturned, but at the final effort, with a better placed grip, success was achieved. However, nothing of interest was revealed.

Perhaps the best known characteristic of this interesting species is the power of imitating the notes of other birds. A good deal of doubt exists respecting the natural notes, in view of the galaxy of melody for which *Menura* is responsible. In my opinion, there are two notes that may be regarded as the lyre-bird's own, in addition to the quieter notes of "sociable" chatter—the familiar and most frequent "blink, blink" that can carry a mile or two in the still, clear mountain air, and the cry of warning, a shrill, almost whistling, sound, generally repeated a second time in a lower tone, after a brief interval.

Many a stalk of ours, creeping noiselessly through the undergrowth, has been abruptly terminated on the observer being observed by this danger signal, repeated farther off, in the silence and instant retreat that have followed discovery. Recently, however, a doubt arose in my mind as to this sound being one of fear, as it has been uttered in the midst of uninterrupted mimicry. But this doubt was practically settled one afternoon lately, when a small, dead sapling unexpectedly fell almost on top of a bird to which I was listening. As it came down with that "swish" that a falling tree makes in still air, I heard the rush of the startled bird, uttering, as it fled, that same peculiar shrill note, repeated, in a tone of unmistakable terror.

Lyre-birds seem to be of a peaceful nature, as we have never observed them fighting among themselves, or attacking other birds. On the contrary, some of the smaller birds will feed with them in order to take advantage of their vigorous upturning of the soil, sharing the result of their efforts. We have noticed the Yellow Robin, and sometimes a party of Scrub Wrens thus associating, unmolested by their benefactors; and I understand this is a habit of the Pilot Bird also.

Just now (June) every day finds the birds busy on their dancing mounds, of which each colony has at least one, probably several in the larger tribes. All the mounds seen have been similar—a very low mound formed of the soil excavated from the surrounding circular trench, from 3 to 4 feet in diameter, closely screened by bracken, or low undergrowth, which frequently renders observation or photography difficult.

Several times, while walking in the late afternoon through a part of Sherbrooke forest that is frequented by lyre-birds, they have been observed going to roost. The younger ones seem to find it necessary to ascend to their chosen spot with the aid of a natural staircase—a dead sapling that, in falling, had been caught half way to earth in the branches of another tree—but the fully grown birds rise by a straight flight of perhaps 30 yards, to the lowest bough of a convenient tree. The timber thereabouts consists mostly of a close growth of Mountain Ash saplings and wattles, 70 feet to 100 feet in height, with practically no branches for 25 feet from the ground. From this first perch the birds ascend by a spiral route, making short flights on a steep ascent from bough to bough, generally keeping a yard or two from the trunk; sometimes flying across into another tree that seems to offer some advantage; and, finally, settling to rest well up towards the tree-tops, 60 feet or 70 feet above the ground. During the climb they will frequently pause to preen feathers and shake their plumage, while sometimes one will stay to give voice to his ideas of mimicry.

This particular haunt of the lyre-bird is being gradually encroached upon by wire-grass, *Tetrarrhena juncea,* which, in the course of a few seasons, has spread over a considerable area of the forest adjacent; covering ground, mouldering logs, and scrub alike with a close matting of tough strands, effectually preventing our lyre-bird friends from finding a living. So effective has the spread of the wire-grass been, in part of the forest, that there is a tendency for it to isolate one of the lyre-bird colonies now living near the edge of the timber. It is unfortunate (to say the least of it), that the the territory of this colony is being rapidly encroached upon by tourists, who, for some months, have been allowed to drive their cars about 200 yards inside the forest boundary, and park them on the actual ground over which the lyre-birds of this section have for some years hunted regularly for their food.

The sight and the sound of a motor-car is far more terrifying to lyre-birds than the approach of a human being. Besides frightening them away to thickets which conceal, but do not offer the food resources of the home glade, one consequence is that they do not roost that night in the usual trees. While it is fortunate that cars seldom visit this spot excepting at week-ends, also is it fortunate that, with *Menura,* the memory of these wrongs is short-lived; and his return, with the daylight, to the spot where on so many yesterdays, breakfast has been forthcoming, offers the hope that it is not yet too late, with suitable action, to preserve to our rare feathered friend his ancient domain.

CONVOLVULUS HAWK-MOTHS.

In the *Naturalist* last year, Vol. XLII, page 21, I gave a brief account of the pupation of the Convolvulus Hawk-moth, *Protoparce convolvuli.* The caterpillars of these moths pupated on April 8 and 13, 1925, respectively. On Jan. 5 last, a male moth, and on the 21st a female, emerged. An interesting feature is that owing to the almost complete splitting of the pupa cases, these moths can easily escape from the free, unattached chrysalis, whereas in many other species of lepidoptera, unless the chrysalis is securely fastened to some object, the imago emerges a cripple. The time spent in the pupal condition was 273 days and 283 days respectively.—H. W. Davey, F.E.S.

VICTORIAN FERNS

By H. B. Williamson, F.L.S.

Part VII.

GENUS POLYPODIUM

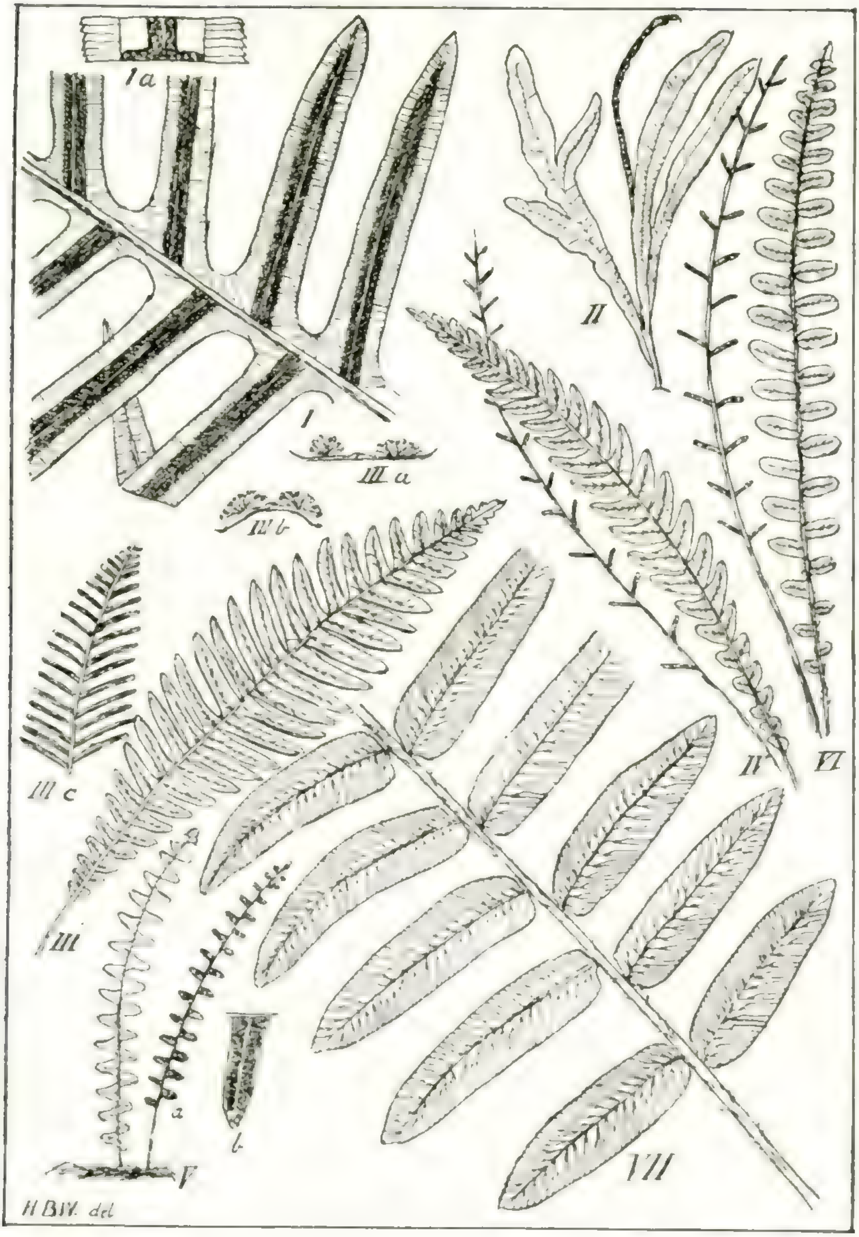
Note.—In the Census of Victorian Plants, p.3., the vernacular names and the locality symbols of *Polypodium pustulatum*, Forst. and *P. diversifolium*, Willd (*scandens*), should be transposed. The rare fern is *P. pustulatum*.

Genus Blechnum.

In Bentham's Fl. Aust., and Mueller's "Key," the genera *Blechnum* and *Lomaria* were kept apart, but they are now included under *Blechnum*. The generic difference is shown below (a), where the first-named species is a true *Blechnum*, and the others belong to the section *Lomaria*.

Key to the Species.

(a) Most of the fronds fertile and all quite similar; involucre never formed by the expansion of the margin. Fig. Ia .. .. B. cartilagineum
(a) Some of the fronds narrow and fertile, others broader and sterile; involucre formed by the revolute margin of the frond itself. Fig. IIIa-b. (Sect. Lomaria.)
(b) Fronds simple, or with a few long segments decurrent on the stalk .. .. B. Patersonii
(b) Barren fronds with numerous segments attached to the rachis by a broad base.
(c) Rachis and stalk glabrous, except at the very base.
(d) Barren segments narrow, 1 to 4 inches long; fertile ones nearly as long. Rachis dark .. ..B. discolor
(d) Barren segments broadly lanceolate, 1 to 1½ inches long; fertile ones ½ to 1 inch long. Rachis pale .. .. B. lanceolatum
(d) Barren segments ovate-oblong, rarely ½ inch long; fertile ones ¼ to ¾ inch long .. .. B. penna-marina
(c) Rachis or stalk scaly or hispid .. B. fluviatilis
(b) Barren fronds with several or numerous pinnæ attached by the midrib only; the lowest rarely small .. .. B. capense



I-VII BLECHNUM

BLECHNUM CARTILAGINEUM, Sw. Gristle Fern (Fig. I). V., N.S.W., Q., This has fronds 1 to 2 feet long, with numerous segments 3 to 6 inches long, almost leathery, with fine teeth on the edge; distinctly veined; dilated and adnate at the base: the upper smaller ones confluent; the lower ones somewhat distant. The sori are in a continuous line on each side of the midrib, with a membranous indusium opening from under the midrib, the two sori at length often concealing the midrib. It is common in the gullies of the ranges near Melbourne.

B. PATERSONII (R.Br.), Mett. Strap Fern (Fig. II). T., V., N.S.W., Q., As., P., N.Z. The fronds are from about 8 inches to nearly 2 feet long, and from ½ to 1 inch broad, generally linear and undivided, but specimens occur with barren fronds pinnatifid, the few segments being 3 to 6 inches long. Fertile fronds are only about ¼ inch broad, the sori at length covering the whole under-surface. Occasionally the lower portion of the frond is barren, and the upper part narrow and fertile. It, like its co-geners, is often found growing in the water of the forest gullies.

B. DISCOLOR (Forst.) Keys. Fishbone Fern (Fig. III). N.Z. and all parts of Australia. Of the genus this is the most widely spread in Victoria, and often persists long after it is deprived of its natural shelter. It is rather a tender fern, with fronds 1 to 2 feet long, much paler beneath, with segments attached to the rachis by a broad base, the lower ones being gradually shortened. The rachis and stalk are glabrous and shining black, with scales only at the base of the stalk. The pinnules of the fertile fronds (Fig. IIIc) are very numerous, 1 to 4 inches long, and about ⅛ inch broad.

B. LANCEOLATUM (R.Br), Sturm. Lance Fern (Fig. IV). T., V., N.S.W., S.A., P., N.Z. The rhizome is thick and sometimes rises into a trunk 6 inches or more. The fronds are 6 inches to 1 foot long, and 2 or 3 inches broad, lanceolate, pointed and curved upwards, with segments dilated at the base, contiguous and often confluent, ¾ inch to nearly 2 inches long, and about 1 inch broad, the lower gradually shortening. The rachis is glabrous, usually pale or green. Segments of the fertile fronds are under 1 inch long, very narrow. Recorded from all districts of the State.

B. PENNA-MARINA (Poir.), Kuhn. Alpine Fern (Fig. V). T., V., N.S.W., Am., N.Z. Fronds 3 to 6 inches long, about ½ inch broad, rising from a scaly rhizome, the stalks slender and glabrous. Segments oblong, rounded, attached by their broad base; not curved upwards. Fertile fronds (a) often much longer; the segments ¼ to ⅛ inch long (b). This fern is frequent is alpine and sub-alpine springs, and resembles small specimens of *B. fluviatilis*, but the absence of scaly hairs on the rachis distinguishes it from that common species.

B. FLUVIATILIS (R.Br.) Lowe. Ray Water Fern (Fig. VI). T., V., N.S.W., N.Z. This is distinguished by its narrow fronds, 6 inches to 1 foot long, with rounded segments, and by the scaly hairs on the rachis. The segments of the barren fronds are oblong, much rounded at the end; the lower ones nearly as broad as long. Fertile fronds much resemble those of *B. lanceolatum*. It has not been recorded from the S.W. or N.W. of the State.

B. CAPENSE (L.) Schlecht. Soft Water Fern (Fig. VII). All parts of Australia except W.A.; all continents except Europe. This is distinguished from the foregoing 6 species by having the pinnæ joined to the rachis by their midribs only. The fronds are very variable, from 3 to 4 feet long, with numerous rigid pinnæ of ½ to 1 inch long and 1 inch broad, with large, scaly hairs on the rachis, to a whole frond of 6 inches in length with membranous pinnæ of ½ to 1 inch long, with the rachis glabrous or slightly scaly. These varying forms agree in having the lowest pairs not much reduced, or very rarely one small pair lower down. The fertile fronds are equally variable, the narrow-linear pinnæ in some specimens under 1 inch; in others, above 6 inches. The large specimens sometimes develop short trunks, and in New Zealand, according to Dobbie, this fern is even more ubiquitous than the Bracken, and the fronds vary from a few inches in dry, exposed places, to ten feet or more in deep wooded ravines. He says:—"Should these (the sides of the gullies) be clothed with *L. Capensis* (*B. capense*), I know of no tougher battle than to struggle through the tangled fronds. They are too close to creep beneath, while to trample under foot the palm-like leaves that rise above one's head is a herculean task." Young fronds, like young gum leaves, sometimes appear of a reddish hue, and remind one of autumn tints on deciduous trees, so that fine patches of this fern, with varying colours from salmon pink and red to bright-green and brown-green, present a beautiful appearance, and one unique in our fern glades. "Soft Water Fern" is not an appropriate vernacular. It would be better to adopt the New Zealand Name "Kio Kio."

VISIT TO PALAEONTOLOGICAL GALLERIES OF THE MUSEUM

There were 22 members and visitors present at the Museum on May 15. By way of introduction, the leader gave a short account of the principal groups of fossil organisms found in the various stages of European sediments, and compared their occurrence with those in Australia. In illustration of his remarks, use was made of the two wall diagrams, showing the stratigraphical succession of the general geological series and of the Victorian strata. The large geologically coloured map of Victoria was then examined, in relation to the distribution of fossil deposits, and the method of using this map in conjunction with the Fossil Key map of Victoria constructed by the leader some years ago for the guidance of provincial visitors, was demonstrated.

This present visit was principally confined to an examination of the fossils contained in the Wall cases of the Galleries. Some of the more remarkable specimens in these were commented upon, such as the slabs of the well-preserved *Glossopteris* leaves, and the remains of their creeping rootstocks. *Vertebraria*; the fossil *Eucalyptus* leaves, from the pleistocene volcanic tuffs of Warrnambool, which are closely related to living species; and the branching stem of the tree-like club-moss, *Lepidodendron*, from Mansfield.

Among the Australian invertebrate fossils were noticed the gigantic rhabdosomes of the hydroid forms called graptolites, as *Goniograptus*, *Dictyonema* and *Trigonograptus*, some of which in the living state probably measured more than a foot across numerous ancient reef-forming corals, as *Tryplasma*, and *Heliolites*, related to the living Blue Coral, and the Honeycomb coral, *Favosites*; seamats, as *Retepora* and the more ancient *Stenopora* from Maria Island; and a perfect and almost unique fossil cidaroid from the Murray Cliffs. Mollusca were well represented, by Giant Oysters from our Tertiary Miocene beds, by megalomorphic Volutes, and the largest known Cowry. The ancient straight-shelled nautili from Loyola were noticed, along with the coiled modern pearly form occasionally met with in our Tertiary deposits, at Muddy Creek and Balcombe Bay. The Queensland Cretaceous Ammonites are here also well represented, thanks to the valuable work of the late Mr. Geo. Sweet, whose collection of these and many other interesting fossils are now included in the museum.

Among the vertebrate fossils, the remains of fishes were pointed out, and attention was particularly given to the remarkable assemblage of sharks' teeth in a slab of limestone from Batesford. The classical finds of *Diprotodon* remain in the Colac, Melbourne and Macedon districts, shown in the cases, are further illustrated by the beautifully restored skeleton of the Callabonna specimen in the special case; whilst the ancient and curious marsupial, *Wynyardia,* was noted. The Moa skeletons, a collection now of great value, excited some interest, in regard to the variation in the leg bones. Another noteworthy exhibit is the restored skeleton of the Madagascar Moa, *Aepyornis,* with its gigantic egg that equals 129 of the ordinary breakfast egg. This bird is supposed to be related to the Australian Emus and Cassowaries.

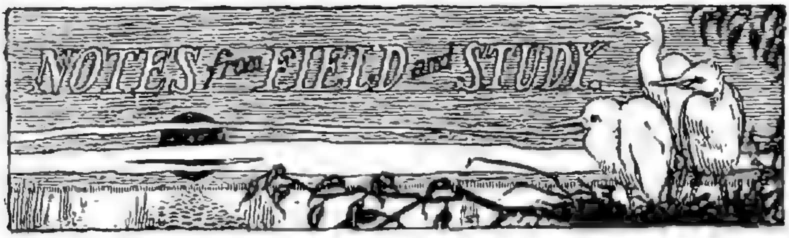
Several interesting fossil specimens were then examined in the Palaeontological Office, where were seen the remarkable collection of Cambrian fossils collected and described by Dr. C. D. Walcott, of Washington:—Remains of ancient seaweeds (*Marpolia*), Bristle-Worms (*Pollingeria, Ottoia*); a jelly-fish (*Peytoia*); Bêche-de-mer (*Eldonia*); Brine-shrimps (*Marella, Burgessia*); and some remarkable Trilobites (*Neolenus, Agnostus*). So wonderfully preserved are these remains of countless ages past, that even the form of the hepatic glands are to be seen on the crustacea, and the delicate markings on the surface of the umbrella of the jellyfish.—Truly the revelations of scientific discovery are limitless.—F. CHAPMAN.

SEA-BORNE SEEDS

An exhibit by the Rev. Geo. Cox, at June meeting of the Club indicates that systematic searching of our beaches would add to the knowledge of seed dispersal. Mango seeds were found at Mornington; and the seeds of many other plants have been noticed, by different observers, on bay and ocean beaches. We give, as well as receive, sending flotillas of seeds from our shores bound for any ports or havens to which chance and ocean currents may bring them.

Australian trees, whose seed cones were jetsam, form a conspicuous feature of the coastal flora of British East Africa, according to Dr. J. W. Gregory. In front of the Residency at Lamu, he saw some Casuarinas. But these had been planted artificially. On the coast at Marerueni, however, the traveller found, on the headland, a clump of sheaoaks; and subsequently noticed others, in similar positions at all points on the coast where he landed, as far south as Natal.

The cones of these immigrants, "must have been carried from Australia by the West Australia and the 'Equatorial Drift' currents, and washed upon the shore." (*The Great Rift Valley,* p. 285)—C.B.


NOTES from FIELD and STUDY.

"The Wild Animals of Australasia" is the title of a book (to be published by George G. Harrup and Co. Ltd., London, this month), that should interest nature lovers and students of natural history alike. The authors are Mr. A. S. Le Souëf, Director of Taronga Park, Sydney, and Mr. Harry Burrell, noted for his studies of the Platypus in its natural state and in captivity The work will contain also a section on the Bats of Australia and New Guinea, by Mr. Ellis Le G. Troughton, of the Australian Museum, Sydney. There will be many diagrams, and a large number of illustrations from photographs. The published price will be 21/-.

INDIGENOUS FLEAS.

All our native animals are more or less infested with fleas, and some have species peculiar to them, for example, the Echidna. Fleas must be sought for while the animal is still alive, or at least warm, as directly the body becomes cool the parasites leave it in quest of another host. The method generally employed in collecting fleas is to place the host in a bag, or other receptacle, in which a few drops of chloroform have been sprinkled. The fleas hastily come to the surface of the fur, and drop off. With a live animal, of course, care must be taken that it is not subjected to the action of the chloroform for too long a time. A large bush rat, recently secured at Belgrave, was acting as host to eight or nine fleas belonging to two distinct species, and one of the specimens was indeed a giant. These I sent to my friend, Dr. E. W. Ferguson, of Sydney, who is making a study of the indigenous flea fauna. He reports that the very large example from the rat belongs to the genus *Macropsylla*, the others being referrable to the genus *Stephanocircus* (they are not the common species, *S. dasyuri*). From the same rat, I also obtained a small reddish-coloured tick, which had taken up its quarters on the inside of the animal's ear.—F. E. WILSON.

THE DRONGO IN VICTORIA.

Records of the occurrence of the Spangled Drongo, *Chibia bracteata*, in Victoria are few, and it is interesting to know that a specimen of this curious and beautiful bird was obtained recently at Lakes Entrance ("Nature Notes," *Argus*, 18/6/26). The Drongo is a familiar species in Northern New South Wales and Queensland; but cannot be regarded as more than an occasional visitor to our State, and an "accidental" one to Tasmania. In the far eastern forests, where one may pass from Victoria into New South Wales unwittingly, this species and several other northern birds have been collected, or observed, and happily, allowed to live. It is a pity that rare visitors are not always recorded without the aid of a gun.

On Dunk Island, in Rockingham Bay, Queensland, I saw the Spangled Drongo at home. "The Beachcomber" has described it so well that other word portraits are not needed. To a southerner, *C. bracteata* appears a strayed wanderer from the Indian region, for Drongos are among the commonest of birds in India. They are aggressive birds, bullies, but courageous. No sight is more familiar in India, says Douglas Dewar, than a pair of Little Drongos, *Dicurus ater*, chasing a kite or a crow ("*Glimpses of Indian Birds*," p. 236). The Spangled Drongo I have seen chasing other birds much larger than itself, and annoying lesser kinds. But, as the late Mr. Banfield observed, "the Drongo is a bird of many moods." It is in the nesting season that he becomes noisy and troublesome to other birds of his neighborhood. He is a master of aerobatic flight; a most entertaining fellow, with a medley of musical notes, uttered freely during his aerial performances.
—C.B.

AN INTERESTING ORCHID "FIND."

The Rev. H. M. R. Rupp, of Paterson, N.S.W., found growing on the hills near Martin's Creek, Paterson Valley, N.S.W., two species of *Pterostylis* (Greenhoods); one, a large-flowered type, the other, a very small type of plant. Specimens were sent to Dr. R. S. Rogers and to myself for examination and opinion. Strangely enough, we all three arrived at practically the same conclusion regarding them: That the larger type is undoubtedly Robert Brown's *Pt. revoluta*, and that the small type is Brown's *Pt. reflexa*. Both species are figured in Fitzgerald's *Australian Orchids*, Vol. 1. Dr. Rogers writes saying that he has compared the small types with the original specimens of *Pt. reflexa*, collected at Port

Jackson (N.S.W.) by Robert Brown, in 1804, and that they agree exactly. In relation to these species of *Pterostylis*, Alex. G. Hamilton writes in his paper on "Orchids of the Mudgee District, N.S.W."—"Two well-defined types growing together at Guntawang, which I took to be distinct species. . . . But Bentham says that they run so much into one another that it is impossible to sort them into different varieties even. Morphologically, there is little difference between the two types." So it would seem that the type so long known in Victoria and South Australia (see Figures in *Introduction to the Study of South Australian Orchids*, p. 8, and *Victorian Naturalist*, July, 1925, p. 62) can no longer be regarded as *reflexa*, and a new name will, in all probability, have to be given to this comparatively large type, which is, most certainly a distinct species, and is recorded in the *Victorian Naturalist*, Vol. xxviii, 1915, p. 231, as *Pt. Praecox* (alata), var. *robusta*.—W. H. Nicholls.

A JUNE DAY AT DARTMOOR

Winter sunshine, a new field to explore, and leisure for rambling made my day at Dartmoor last month as pleasant as a naturalist could desire any outing to be. The district may be familiar to many other Club members, but to me it was "virgin soil," and in our journal, apparently, little has been recorded of this part of South-Western Victoria. In September, 1916, Mr. J. W. Audas visited the Portland district, and all botanists who think of spending a holiday there, should read his paper in the *Naturalist*, March, 1917. He gives an excellent survey of the plant life; and though my ramble was over different country, the flora of Portland and district doubtless does not differ from that of Dartmoor, on the Heywood-Mt. Gambier line.

Fern hunting, I found the lovely little rock-fern, *Asplenium trichomanes*, growing freely in dry or moist crevices of a cliff-face—the big hill near the Glenelg River bridge, and overlooking the railway. Deep-rooted in cracks hardly wide enough to admit a stout knife-blade, the spleenworts' fronds formed green tracery on the limestone. Some were close to the ground; others—the finest specimens—inaccessible without rope or ladder. In marshy spots along the river, in the township, other ferns grew, but none new to me. I botanised only "by the way," and kept no record of species. But I noticed in crevices of great boulders, at the base of the caves near the river, west of the falls, both the

Common Spleenwort and the delicate Rue fern, *Anogramma leptophylla*. Hairy bracken, *Pteris comans*, was there too, among the rocks, and its companion, here and there, was *Correa speciosa* blossoming. Noble bushes of the *Correa* grew on shelves of limestone, not shaded, but in sunshine. Shallow caves, these by the river, with trees and shrubs above and below, but within, lacking plant life.

Birds were not abundant, and all the species observed were old friends, as the Crimson Parrot, Grey Thrush, Collared Butcher-bird, Magpie-lark, Thornbills, etc. The swamps further west, in nesting time, I was told, are "thick with birds," ducks, Pelicans, and other water-lovers. Here the Native Companion still occurs in numbers; the swamps at present are safe for them, but as the South-West becomes better known, it is feared, cranes and other haunters of the swampland, will suffer. Game laws may not protect them from all who motor along the Prince's Highway. "It's fellows from the city, not residents, who are bird enemies," a Dartmoor man declared.

Rambles round Dartmoor, pleasant in winter, must be delightful in spring and early summer. It's a good district for the naturalist, and extending his excursions towards the border he will be rewarded still. I went to Puralka, to examine the shallow caves, where Mr. J. S. Lockie recently found fossil bones of extinct species of *Macropus*, and other marsupials. A report of his discoveries, including a worked flint, possibly a prehistoric implement, was published in "The Herald." This locality, I commend to fossil hunters especially; and those who are interested in relics of the aborigines. In one paddock, Mr. Lockie showed me many old mia-mia sites, and we picked up scores of scrapers. Stone axes sometimes are revealed by the plough down Dartmoor and Puralka way. The paddock mentioned above, must have been a favourite resort of the lost tribes. They had good hunting around the swamps; and kangaroos even now are plentiful in the open forest country.

The Glenelg at Dartmoor is a picturesque stream; its grandeur is seen along reaches nearer to the sea. The Club might arrange a week-excursion to the South-West, making Dartmoor the centre. Mr H. V. Richter, of Dartmoor, who showed kindness to a naturalist on the prowl, is keenly interested in his district. Any members of the Club who go there may rest assured of a welcome to Dartmoor.—CHARLES BARRETT.

The Victorian Naturalist

Vol. XLIII—No. 4. AUGUST 5, 1926. No. 512.

FIELD NATURALISTS CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall, Victoria Street, on Monday evening, July 12, 1926. The President (Mr. E. E. Pescott, F.L.S.) occupied the chair, and about 100 members and friends were present.

CORRESPONDENCE, ETC.

From Mr. Alfred D'Alton, Hall's Gap, stating that the cutting of grass-trees was being carried out in the southern end of the Grampians, but that no damage to the native flora was likely to occur.

From Mrs. G. A. Keartland, thanking the Club for expressions of sympathy with her in her recent bereavement.

Mr. P. R. H. St. John moved that Mr. J. W. Audas, F.L.S., be appointed a delegate of the Club to the Perth meeting of the Australasian Association for the Advancement of Science, in place of Mr. J. A. Kershaw, who intimated that he would be unable to go. The motion was seconded by Mr. C. French, Jnr., and carried unanimously.

A report on the visit to the National Herbarium on June 19 was given by Mr. J. W. Audas.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. A. C. Nilson, 58 Speight Street, Newport; Dr. R. M. Wishart, Riversdale Road, Glenferrie; Mrs. E. Hanks, 736 Sydney Road, Coburg; and Mr. D. Blair, 59 Patterson Street, Middle Park, were elected as ordinary members.

GENERAL.

It was resolved, on the motion of Mr. J. W. Audas, seconded by Mr. H. B. Williamson, that it be a recommendation to the Committee that part of the proceeds of the Wild Flower Show, to be held on October 5th next, be devoted to charitable purposes. The President announced that His Excellency the Governor and Lady Somers, had accepted an invitation to attend the Show, and that His Excellency had consented to perform the opening ceremony.

The Hon. Secretary read the minutes of the meeting at the Herbarium on June 29th, held for the purpose of forming an Orchid Section of the Club.

Mr. C. Daley moved: "That the area known as Sherbrooke Forest and Gully, be proclaimed a permanent National Park and a sanctuary for all native birds and mammals." The motion was seconded by Mr. F. E. Wilson, and carried unanimously.

Mr. C. Barrett moved: "That Sir Frank Clarke be invited to arrange for and introduce a deputation to the responsible Minister, to place the views of the Club before him." Mr. L. L. Hodgson seconded the motion, which was agreed to without a dissentient.

Mr. W. F. Gates referred to the Dandenong Police Paddock, which would become ordinary Crown Lands again in a few months. He moved that the Club support the Town Planning Association in its efforts to have this area created a reserve. Mr. W. Thorn seconded the motion, which was carried unanimously. It was also resolved that a letter be written to the Lands Department regarding this matter.

LECTURETTES.

The President delivered a lecturette on the ferns and other flora of Sherbrooke Gully and surroundings, and referred to the many and varied beauties of this popular resort. Mr. C. Barrett followed with a short lecture, dealing with the birds to be found in the locality. Both lectures were illustrated with lantern slides.

EXHIBITS.

By Mrs E. Coleman: (1) Specimens of *Pterostylis Toveyana*, Ewart and Sharman, showing flowers closely resembling *P. alata* in colour, shape, and structure, but with stem-leaves broadly ovate, as in *P. concinna*. (2) Specimen of *P. Toveyana* with leaf-development narrow-linear, as in *P. alata*, but with flower resembling *P. concinna* in shape and colour. (3) Specimen of *P. Toveyana*, with three lower leaves broadly lanceolate, showing resemblance to leaves of both *P. concinna* and *P. alata*, the two upper leaves narrow-lanceolate, as in *P. alata*. (4) *P. Toveyana* buds from groups 1 and 2, latter showing that stem-leaf development is present in immature plant. (5) *Pterostylis alata*, Reich. f., for comparison. (6) *P. concinna*, R.Br.

By the Rev. G. Cox: (1) Native stone implements from Somerville and Cape Woolamai. (2) Walking fish from Gladstone River (Queensland). (3) Coastal tea-tree in bloom, from Mornington.

By Mr. C. Daley: Egg-cases of the Bird-dropping Spider (*Selena excavata*), on which the mother-spider kept continual watch for at least six months. First observed in February, when there were eight egg-cases; abandoned in June, when there were 13 egg-cases in the group.

By Mr. A. E. Rodda: Fungi growing in outcropping mudstone from Mitcham.

By Mr. E. E. Pescott: Cultivated specimen of Bushy Heath Myrtle—*Thryptomene (Mitchelliana) Calycina* (F.v.M.).

By Mr. H. Borch: Six pupae of *Troides euphorion*, from Cairns district, North Queensland.

By Mr. L. L. Hodgson: Opossum trap, found set during close season, in Sherbrooke Gully.

EXCURSION TO NATIONAL HERBARIUM.

On June 19th, 25 members of the Club visited the Herbarium. Some notable specimens were exhibited, plants collected by Banks and Solander in Australia in 1770, and by Robert Brown in the years 1802-5; also a set of plants from Samuel Petiver's Herbarium, gathered in India and North America more than 200 years ago, and described in the *Philosophical Transactions of the Royal Society*, at the beginning of the 18th century. Some attention was devoted to the library, which now contains more than 10,000 volumes. The National Herbarium ranks among the leading ones of the world. The shelves are carefully numbered, so that there is no difficulty in finding any desired plant. The facilities for reference to the contents of the Herbarium were fully demonstrated. During the afternoon a paper on the Herbarium and its uses, was read by the leader.—J. W. AUDAS.

Mr. Alfred D'Alton (Hall's Gap), replying on June 25 to the Hon. Secretary's letter with reference to grass-trees being cut in the Grampians for commercial purposes, said: "I believe this is being carried on in the southern end of the Grampians. I do not think any damage will be done to native flora, as the best and rarest of our flowers do not grow on grass-tree country."

The following donations to the Club's funds have been received since the beginning of the financial year.—Mr. J. E. Dixon, £1; Mr. F. Pitcher, 10/-; Mr. A. J. Tadgell, £2; and Mr. A. E. Keep, £5

Greenhood Orchids of Victoria.

By W. H. NICHOLLS.

Part II.

NOTE.—*Pt. Tobeyana*, "Ewart," a small, ill-defined species, mentioned in Part I. of this paper, has been found growing in a new district (Frankston). For specimens, I am indebted to Mrs. E. Coleman.

Two of the 14 species dealt with in this concluding part of my paper, are very rare. *Pt. squamata*, R.Br., and *Pt. furcata*, Lindley. The former I have not seen in a fresh state, and its existence in Victoria is doubtful. There are no Victorian specimens of either plant in our National Herbarium, though both have been on our records for many years. Dr. Rogers records *Pt. furcata* from at least two Victorian districts. But recorded Victorian specimens of *Pt. squamata* do not exist.

In the Herbarium, a Tasmanian plant is preserved. A note is attached in the late Baron Sir Ferdinand von Mueller's own handwriting: "This is the true *Pt. squamata*, R.Br." To me, it seems to agree with Dr. Rogers' *Pt. pusilla* (a smaller type)—the flowers have no caudæ to the sepals. Magnified, the ciliated apices of the two pear-shaped swellings, with the deep channel between, are seen on the *reverse* side of the rather short, ovate labellum. (See illustration.) These details are at variance with the published descriptions of Robert Brown's species.

Pt. acuminata, R.Br. (Fig. 16.) (Pointed).

The type form of the Pointed Greenhood is a slender plant, from 6 inches to 10 inches in height, with a flower somewhat closely resembling in shape and coloration *Pt. nutans*, R.Br., but without the nodding habit which characterises that familiar species. Apex of galea shortly pointed; labellum glabrous (or pubescent), oblong-linear, recurved or semi-circularly recurved, projecting through the acute sinus of the lower lip, tip sharply pointed. Lower lip narrow, wedge-shaped; the lobes embracing and exceeding the galea; tips acuminate, not very long. Stem-bracts, minute, sheathing, 1-2. Basal leaves usually oblong-lanceolate, or lanceolate; acumi-

Though a few records exist of this species having been found in Victoria during the autumnal months (the normal flowering time for the species in N.S.W. and Q'ld.), specimens have not been seen for a considerable period, and the species has been regarded as extremely rare, if not extinct. A few years ago a Greenhood was discovered in several parts of this State, S./N.E./N.W. (between the months of August and December), and in considerable numbers in some districts. It was first considered to be a hybrid. The labellum is pubescent, with a blunt tip, and the flower usually in a very slight nodding position. It is of very variable habit, and is occasionally rather stout, with well-marked stem-leaves, as in *Pt. furcata,* Lindley. Experience with the forms from N.S.W. and Queensland showed that our "spring" flowering form cannot be separated, and must be regarded as a variant form of the above species.

Victoria, New South Wales and Queensland. Combined flowering periods: March-December.

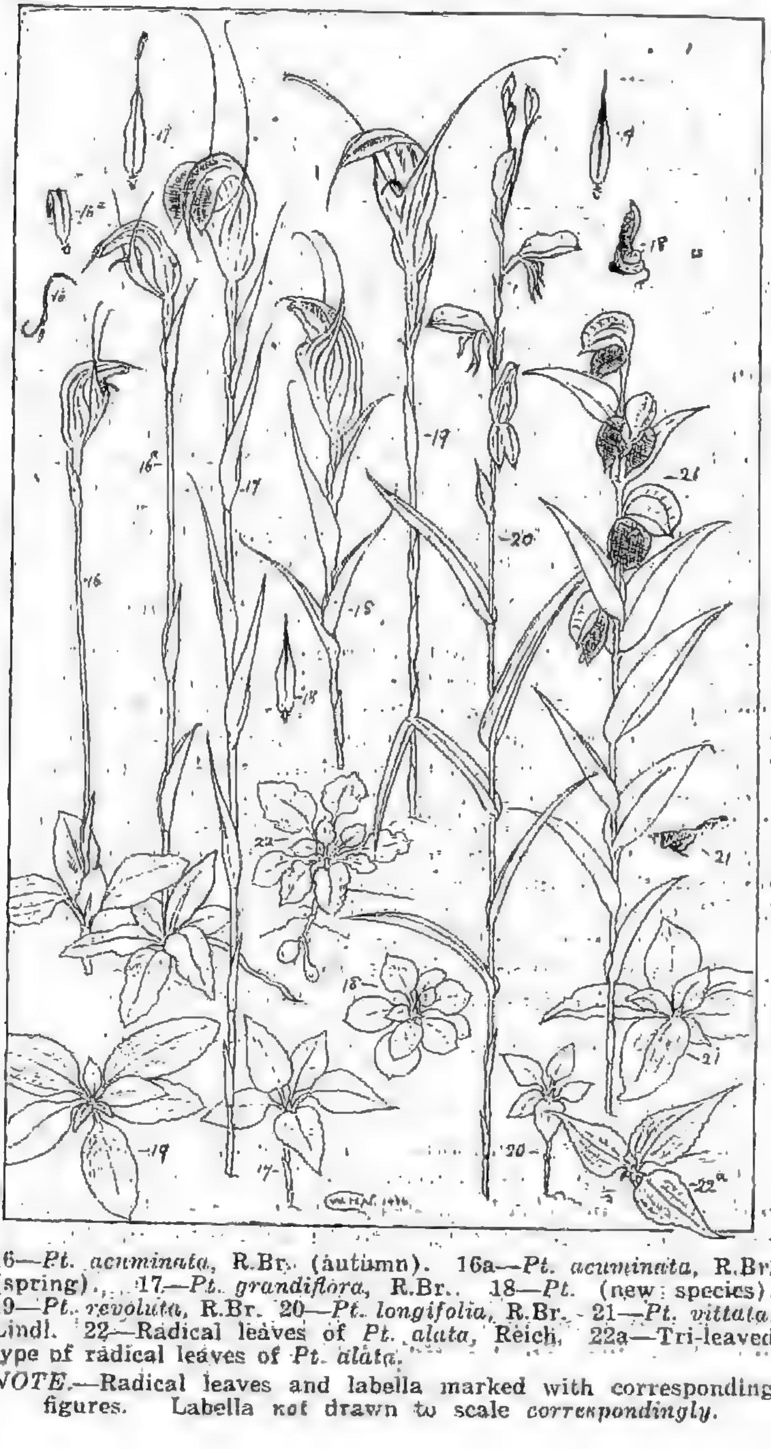
Pt. grandiflora, R.Br. (Fig. 17.). (Large-flowered).

The rare Long-tongued Greenhood does not bear the largest flowers, but doubtless it is the handsomest of the Greenhoods. The plant grows from 6 inches to 15 inches in height, and has long lanceolate stem-leaves. It is restricted to moist mountain gullies and other situations where abundant shelter is provided. It has a distinctive type of labellum. (See illustration.) The green and rich red-brown colour-scheme, combined with the beautiful veining of the widely dilated tips of the paired-petals, give to the single flower a charm all its own. For a vernacular, I suggest "Veined Greenhood." Basal leaves (rarely present in the flowering plant) appear from the thickened scape, as a lateral growth.

Victoria, New South Wales and Queensland—May-July.

Pt. ?? (Fig. 18.)

The Striped Greenhood. Plant from 2 inches to 14 inches in height; stem-leaves usually 4-5, narrow-lanceolate, somewhat rigid, clasping at the base; lower ones bract-like. Flower large, solitary, white, and clearly (often firmly) striped with dark green and some purplish or brown markings. Labellum narrow-lanceolate, tapering to a fine point. Pale in colour. Radical leaves similar in shape to *P. alata's,* but margins not crisped.



16—*Pt. acuminata*, R.Br. (autumn). 16a—*Pt. acuminata*, R.Br. (spring). 17—*Pt. grandiflora*, R.Br. 18—*Pt.* (new species). 19—*Pt. revoluta*, R.Br. 20—*Pt. longifolia*, R.Br. 21—*Pt. vittata*, Lindl. 22—Radical leaves of *Pt. alata*, Reich. 22a—Tri-leaved type of radical leaves of *Pt. alata*.

NOTE.—Radical leaves and labella marked with corresponding figures. Labella *not* drawn to scale *correspondingly*.

Victoria, South Australia, and Western Australia—April-October.

NOTE.—This plant has been known for many years as *Pt, reflexa*, Br., but the re-discovery recently, in the Paterson district, N.S.W., of a small Greenhood, agreeing in all particulars with the original plants, that Robert Brown collected at Port Jackson, in 1804, has re-opened the question of the identity of this large-flowered plant, which seems to be abundant in many parts of Victoria, also South Australia and Western Australia. Dr. Rogers, to whom the question was referred, agrees also that this plant, which has been described by Prof. Ewart (Melbourne University) as *Pt. praecox (alata), var. robusta.* (*Proc. Roy. Soc., Vic.*, Vol. xxviii., *New Series,* 1926) is distinct, and must now be regarded as a new species. See also *Pt. revoluta*, R.Br. (Fig. 19).

Pt. revoluta, R.Br. (Fig. 19). (Revolute).

The Autumn Greenhood. A very graceful, normally single-flowered species, which, more often than not, is found growing in a solitary state. The large flower is white, with green stripes and some light-brown markings (often absent in succulent forms); the stem is almost leafless. Plant usually between 5 inches and 12 inches in height. This Greenhood is widely distributed throughout Victoria and New South Wales, and after good late summer rains, it usually flowers abundantly, sometimes occurring in fairly large colonies. The flowering period is during March, April, and May, and the species is seen at its best in its alpine form, growing on rocky ridges. Alpine examples are much hardier (less succulent) than some of the lowland specimens.

This species has been known for many years, having been confused with *Pt. reflexa, Br.*, a *much smaller plant*, which is restricted (as far as it is at present known) to New South Wales and Queensland. Bentham, who had access to Robert Brown's types, would not accept them as variant species, and included these and other similar species (incl. Fig. 18) under the one specific name. The differences, he concluded, were not sufficient to justify separation. Critical examination of all parts of living plants of both species, has convinced me that the earlier botanist was fully justified in his decisions. The radical leaves of *revoluta* are oblong-lanceolate, those of *reflexa*, broadly-ovate, with crisped margins. There are many differences in the details also.

Victoria and New South Wales—March-May.

Pt. longifolia, R. Br. (Fig. 20). (Long-leaved).

The Tall Greenhood is restricted to moist, well-sheltered gullies, and shady places in our woodlands. Often it grows among almost impenetrable scrub, and the branches of fallen trees. It is easily recognised by its very long, lanceolate stem-leaves, and very small, greenish flowers. Plant usually from 6 inches to 18 inches in height, but in favourable situations, up to 2 feet or more. Stem-leaves longest near the middle; those within the floral cluster reduced to acute bracts; those at the base of stem scale-like. Flowers usually from 4 to 8; conjoined sepals in a pendent position (as in *Pt. rufa*, etc.); lobes rather shortly pointed, occasionally tipped with red; labellum, glandular, laterally lobed, tip bifid; base very thick, very irritable; lateral growth of leaves sometimes present in the flowering plant.

All States (excluding Western Australia)—July-October.

Pt. vittata. Lindley. (Fig. 21). (Banded).

The Banded Greenhood is not regarded as a common plant in Victoria, though it is sometimes fairly numerous in a few coastal districts, and it also occurs on some of our mountain ranges. Similar, in general appearance, to *Pt. longifolia*, Br.; but in *vittata* the habit is stouter; the lanceolate stem-leaves are much broader and those within the floral raceme much longer. Plant usually from 5 inches to 15 inches in height. Flowers usually one to eight; in a nodding position, usually reddish-brown, and distinctly banded across the upper part of the galea; conjoined sepals pendent, tips acute; labellum, broadly-oblong, glandular, with a single short spike protruding from the much thickened base; very irritable. Radical leaves ovate-oblong or oblong-lanceolate.

All States—May-July.

Specimens of this species from Point Lonsdale, June, 1923(?), collected by Mr. G. Ampt, had numerous flowers of a grey colour, agreeing in these respects with the Western Australian plants.

P. alata (Labill), Reich. (Fig. 22). (Winged).
(*Pt. praecox*, Lindley).

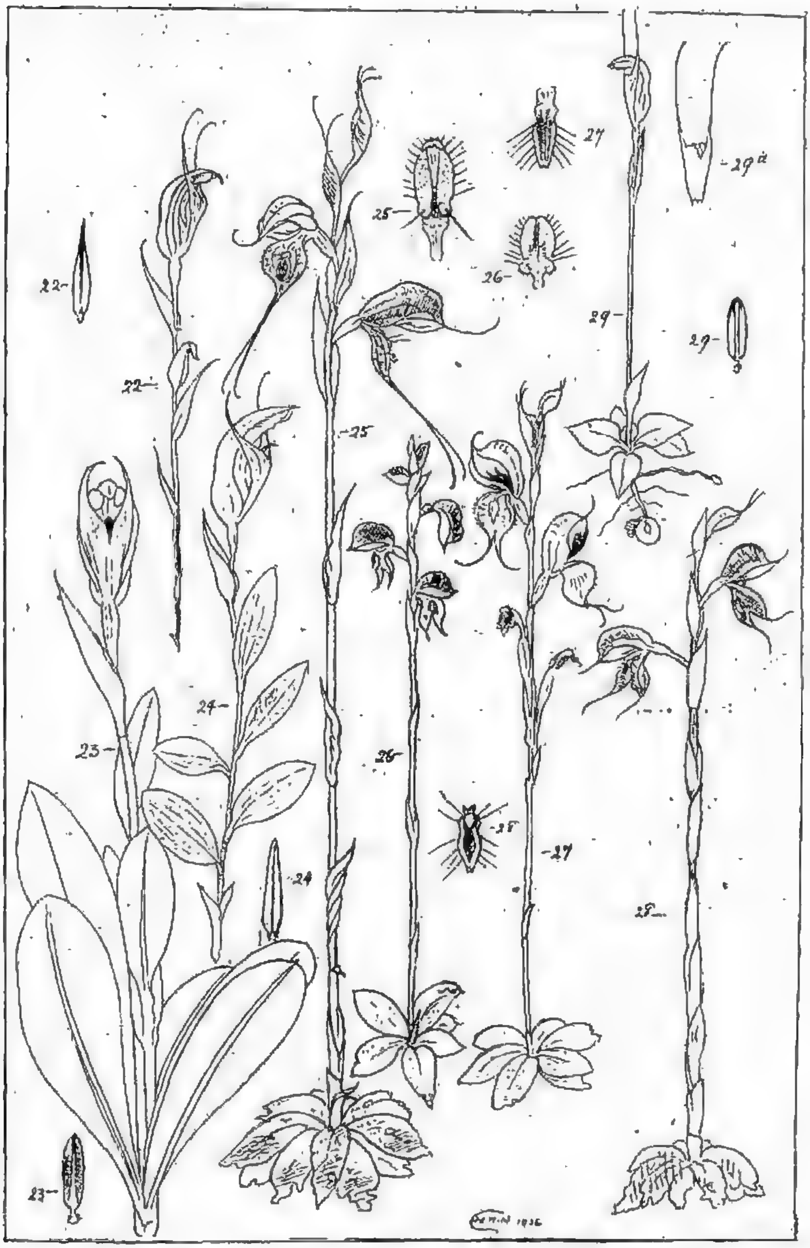
The Purplish Greenhood is the daintiest of the small single-flowered species. Widely distributed, growing chiefly within the shelter of trees or shrubs. Plant usually between 4 inches and 10 inches in height. Stem-leaves small and bract-like, rarely longer than 1½ inches. No basal leaves at flowering time. Flower usually solitary, and with dark-green, longitudinal stripes, and some purplish or brown markings. Specimens received recently from Tasmania had dull sage green striae on a grey ground; other markings being of a light rufous tint. Galea erect, sometimes (chiefly in small flowers) incurved. Tip short; lower lip erect, the filiform points exceeding the galea and hooked forward at the tips. Labellum brownish, lanceolate, almost straight, with an acute point; tip not protruding beyond the wide abrupt sinus of the lower lip; column of sturdy form, usually green. Radical leaves, broadly ovate, or ovate-lanceolate; margins crisped.

Victoria, New South Wales, South Australia, and Tasmania—May-July.

Fig. 22A, a type of plant observed, so far, only in dry seasons, and only in those species of Greenhoods, having no basal leaves during the flowering period. On the basaltic and granitic formations, where conditions the reverse of congenial often prevail, they are frequently met with, and in considerable numbers in the following species, *Pt. truncata*, Fitz., and *Pt. ? new species.* (Fig. 18). Five such plants of *Pt. alata*, Reich. (as illustrated) have been found by Mr. A. B. Braine, in the Ashburton district (June, 1923.) Observations on collected specimens and in the field support the view that these tri-leaved plants are representative of the interrupted growth caused, no doubt, by the abnormal conditions prevailing prior to the flowering period. In a normal season, these plants would unquestionably have produced flowers (a rudimentary bud is apparent in many of them); the energy of the plant having been diverted, through the late season.

Pt. cucullata, R.Br. (Fig. 23). (Hooded).

The Leafy Greenhood is not a very common plant, but in some localities may be gathered in considerable numbers. I have, so far, received it from but two Victorian localities—Broadmeadows and the South Coast (near Rye). It derives its specific name from the large upper bract, which sometimes envelopes the ovary and portion of the large flower; suggesting, then, the typical monk's hood. The plant is variable in height, measuring from 2 inches to over a foot. The stem is well-protected with



22—*Pt. alata*, Reich. 23—*Pt. cucullata*, B.Rr. 24—*Pt. furcata*, Lindl. 25—*Pt. rufa*, R.Br. 26—*Pt. pusilla*, Rogers. 27—*Pt. Mitchellii*, Lindl. 28—*Pt. squamata*, R.Br. 29—*Pt. nana*. 29a—Lower lip of *Pt. nana* (from inside) showing inflexed lobule.

very long (often succulent) leaves, varying in shape, but usually oblong; those at the base longest and somewhat crowded, sessile or almost so. The single green flower is marked with brown, or a rich cayenne colour. Lower lip erect, wedge-shaped, lobes shortly-acuminate, usually exceeding the galea in the Victorian plants (as illustrated.) Labellum, oblong-elliptical; tip, blunt, slightly recurved, often richly coloured. The largest specimens I have examined came from South Australia: tall, yet sturdy plants, much darker in colouring than the Victorian plants. (*Pt. Mackibbinii*, F.V.M., a synonym.)

Victoria, South Australia, New South Wales and Tasmania—September—October.

Pt. furcata, Lindley. (Fig. 24). (Forked, lateral sepals).

The Forked Greenhood is one of our rarest orchids, and records prove that very few specimens have been found in Victoria. Dr. Rogers reports a specimen from Cockatoo (Dec.), and another from Condah, in the Hamilton district; while the Rev. H. M. R. Rupp, of Paterson, N.S.W., has a robust form of this species in his herbarium; it was collected by him on Mt. Buninyong (near Ballarat) many years ago. There are no specimens in the National Herbarium, excepting two type forms from Tasmania, where the species seems to be less rare.

The plant resembles, in some degree, *Pt. cucullata*, R.Br.; but is much more slender, usually between 4 inches and 10 inches in height, with from 3 to 5 fairly large, oblong-lanceolate leaves, dispersed upwards on the stem, largest near the base; those on the stem, leaf-like bracts. The fairly large, single, flower is greenish, with some brown markings; galea inclined upwards; lower lip wedge-shaped, with the points exceeding the galea; labellum long and narrow, wider at the base; tip rather blunt, very slightly curved, *channelled on each side of the longitudinal ridge on the upper surface.*

Three specimens of this plant were received recently from Tasmania. The labellum and the markings on the fore-part of the galea of all three were of a bluish colour.

Victoria, South Australia, and Tasmania—November-January.

Pt. rufa. R.Br. (Fig. 25). (Reddish).

The Rusty Hood is a hardy plant, with large tubers, which enable it to flourish in the most arid situations, though it is not confined to them. It is the largest of the "Rufa" group, other species being somewhat similar in habit and colouring. Height, from 3 inches to 12 inches. Basal leaves in a withered state when the flowers have opened; leaves shortly petiolate; stem bracts 2-5, acute, loosely sheathing. Flowers 2-5, green with reddish-brown markings. Sepal prolongations vary in length (up to 1¼ inches in my specimens), conjoined sepals not embracing the galea, as in most of the better-known Greenhoods, but pendant. On the concave platform formed by their connate parts rests the short sensitive labellum, which is membranous, with tip upturned; margins fringed with short hairs; two long, upright setae at the base.

I received several fine plants of this orchid from the Bendigo district, these have flowered year after year, and I find the green rosette is sometimes retained until the flowers have withered.

Widely distributed, all States—November-December.

Pt. pusilla, Rogers. (Fig. 26.) Very small).

The Ruddy Hood. Plant 2½ inches to 8½ inches high, with a green* radical rosette at time of flowering. A much more slender and smaller plant than *Pt. rufa,* R.Br. Flowers 1-8, smaller, but somewhat similarly coloured. Since first described and illustrated by Dr. Rogers (*Trans. Roy. Soc., S.A.,* Vol. xlii., 1918), larger specimens have been found. Sepals acute, but not caudate; labellum, fleshy, very sensitive, oblong or ovate-oblong; tip straight; lateral margins beset with a few long hairs; tip and apices of the two pear-shaped swellings (between which runs the central trough which marks the under-side most uniquely). shortly ciliate, margins at base, thickly and shortly ciliate. This plant is by no means common, and is never found in colonies of any size.

Victoria, South Australia and Tasmania (?)—September and October.

Pt. Mitchellii. Lindley. (Fig. 27). (After Sir Thomas Mitchell, who discovered the plant in 1846).

---

*A few plants found in bloom on a dry stony hillside near Wattle Glen (Sept., 1924) had withered basal leaves.

The Mitchell Greenhood is a slender species, 6-10 inches in height, with rather large flowers, 1-6, in a loose raceme; green, with reddish tints; usually much darker than in the other members of this group. Basal leaves in a green rosette, very shortly petiolate. Stem-bracts few in number, 2-4; very small, sheathing. This is not a common plant; it grows on lightly-timbered hillsides. It is at once distinguished from *rufa*, by the (comparatively) larger flowers, and the tails of the conjoined sepals, which are strangely divergent and about 1 inch long. Apex of galea with a fine point about ½ inch in length, recurved. Lower lip, pendant; lobes ovate; labellum, very irritable, slipper-shape, rather thick and fleshy, glandular; tip depressed a little and bifid slightly on the reverse side. The contracted basal portion usually without hairs. Lateral margins sparsely ciliate.

All Eastern States (incl. Tasmania)—August-October.

Pt. squamata, R.Br. (Fig. 28). (Scaly, stem-bracts).

The Scaly Greenhood is an exceedingly rare, glabrous species. Under 10 inches in height, and not unlike some forms of *Pt. Rufa*, R.Br., but having smaller flowers, 1-3, coloured like *rufa*, and more stem-bracts, 6-8. It has also a withered basal rosette at time of flowering. Apex of galea, shortly-pointed; lower lip pendant; lobes about ½ inch in length; labellum ovate-oblong, fleshy, markedly glandular; tip straight, bifid, lateral margins, and sides of the thickened but rather narrow base, beset with long setae, very irritable. Column wings upper margins not toothed or ciliated.

Victoria (?), Tasmania and South Australia—Nov.

Pt. nana, R.Br. (Fig. 29). (Dwarf).

The Dwarf Greenhood was described by Robert Brown from specimens gathered by Colonel Paterson in Tasmania, a little more than a century ago. It is a very slender, dainty species, rigidly erect, usually between 2 inches and 6 inches in height; occasionally 12 inches. Normally, single-flowered, with an inflexed denticular, green, lobule inside the sinus of the lower lip. (See Fig. 29A). Basal leaves in a rosulate cluster, usually found in groups or large colonies at the base of trees in open forest country, and in sheltered positions under shrubs. Dr. Rogers records a find at Albany, Western Australia. The plants were in colonies on the erect trunk of a large Banksia. In one case 8½ feet above the ground. Probably the result of flood waters.

All the States (excepting Queensland)—July-October.

Correction.—*Naturalist*, July, 1926, p. 75, 7th line from bottom; delete words "*similar to*."

The National Herbarium, Melbourne.

BY J. W. AUDAS, F.L.S., F.R.M.S.

During the year 1857, the Government of Victoria realised the need and importance of a properly equipped State Herbarium. A large building was erected in the Government House Domain, under instruction of the Hon. Captain Pasley, then Minister of Public Works, for the reception of the botanic treasures accumulated by the then Government Botanist, Dr. Ferdinand Mueller—afterwards Baron von Mueller; the private collection formed by him since 1840 also became located there as a gift.

Through interchanges, from results of botanical expeditions, through the liberality of public institutions, and by the purchase of Dr. Sonder's Herbarium, these collections (vast already in 1857) became so extensive that, at the present time, the number of sheets containing the pressed and dried plants can be estimated at one and a-half millions. The Herbarium is now equal to any of the few really grand Herbaria in other countries, while it far exceeds any other in the number of Australian specified forms. The whole collection is arranged according to the systematic Census of Australian Plants, by Baron von Mueller, the Census serving as an index for the Australian collection. The extra-Australian, New Zealand, Papuan, and Polynesian divisions of the Herbarium are each kept separate—such precious possessions as these must by no means be considered as transient, or, under ordinary care, as perishable—indeed, in some of the Continental Herbaria specimens are preserved quite uninjured, though collected fully 300 years ago.

Our own collection contains numerous plants which were prepared by Ehrhart, Thunberg, Giseke, and other disciples of Linnaeus, and by the pre-Linnean botanist, Petiver, who died in 1718; also some collected by Robert Brown in Australia, during the years 1802-5; and by Banks and Solander in 1770. The Australian collection is kept separate from the extra-Australian collection, to facilitate access for daily reference in studying the flora of the Commonwealth.

The names of the contributors towards the Australian portion of the Herbarium, can be gathered from the *Flora Australiensis* and the *Fragmenta Phytographiae Australiae.* It is, however, worthy of special remark that the large array of Western Australian plants of Drummond, Oldfield, L. Preiss, Maxwell and Max Koch, is most extensively represented in our Herbarium.

As regards New Zealand plants, we are fortunate in possessing collections from Dr. Sinclair, Sir Julius Haast, Professor Kirk, R. and G. Forster, and Mr. J. Buchanan. In reference to the extra-Australian plants in our possession, their intrinsic value may be recognised when it is stated that there are at least 200 distinguished botanic celebrities in whose gains we were able to share. The contributors include Asa Gray, Agardh, Beccari, Cooke, Ecklon, Engler, Fenzl, Hampe, Sir Joseph Hooker, Kotschy, Lehmann, Lindley, Moritzi, Philippi, Reichenbach, Schimper, Torrey, Wallich, Zeyher, and many others. The object of accumulating such large stores of prepared plants is not to satisfy idle curiosity, but to trace, at any time, characteristics of any plant of either hemisphere.

1. To demonstrate the range of any particular plant over whatever portion of the world it may be indigenous.
2. To identify the description of any plant in any work at any time with original and possibly with typical or authenticated specimens.
3. To institute by comparison even into minute details the precise names of any species whatever their position in the botanic system may be.
4. To guide to a recognition of any plant whether for medicinal, forestal, pastoral, technologic or any other purposes.

Nearly the whole system of records of the world's vegetation rest on such material, for only in our Herbarium can we bring together the plants of the whole globe, for connected studies—the number of species constituting the flora of the world being not less than 200,000, irrespective of varieties and exclusive of mosses, lichens, fungi, and algae.

There is no botanical museum attached to the Herbarium, though this is a very useful adjunct, as it teaches us to appreciate the general relations of the vegetable world to man. At the Royal Botanic Gardens, Kew, the most extensive economic museums in the world are situated. To illustrate their usefulness, I may cite as an example the Cocoanut palm, *Cocos nucifera*. There are pictures showing the tree as it grows, near the sea, in tropical countries; also portion of the trunk, just as it comes from the tree. Then come examples of innumerable things made from the most valuable of all palms. There are samples of cocoanut oil, with soap and candles made of it. Sugar and vinegar made from the sap of the tree; walking sticks and ornamental articles from the wood, various toys and utensils, such as teapots, cups and ladles from the shell of the nut, and samples of the kernels now largely used in confectionery. There are also many articles made from the strong fibres of the husk, such as mats and matting, ropes and rough cord, handbags and brushes. The native races also make various articles of dress and ornamental material from one part or other of this palm.

At the Herbarium we have a fine library, containing valuable books, more than 10,000 volumes, by Linnaeus and other authors up to the present time; also works by several pre-Linnean authors. These books, in the main, deal with botany, but especially that branch of botany which treat of the classification of plants. Included, also, are several books of travel, which contain more or less botanical matter. Though the books are mainly necessary for carrying on the practical work of the Herbarium, the early authors, whose writings are chiefly of historic interest, are well represented.

Mention might be made of the following:—

Stirpium Historiae Pemptades, by Dodonaeus. Published in 1583.

A Voyage to New Holland, by Capt. William Dampier (1699). This interesting little volume contains illustrations of 18 Australian plants. The genus *Dampiera* was named in this navigator's honor by Robert Brown.

Flora Australiensis, by George Bentham. A great work begun by the author in 1863 and finished in 1878. During this long period, Baron von Mueller, collaborating, regularly forwarded all his available collections of Australian flora, with notes thereon, to London. More than 100,000 specimens were despatched, when Bentham examined them and in due course returned them safely to the National Herbarium, Melbourne. This is a most valuable set, and the standard work on the flora of Australasia. It comprises seven volumes.

Prodromus Florae Novae Hollandiae, by R. Brown (1810). This is one of the most important works ever written on phytography. It contains the notes and the material gathered during the whole of Flinders' memorable expedition, and during subsequent travels of Robert Brown and his companions in New South Wales and Tasmania. Unfortunately, however, the intended second volume of this splendid work never became elaborated, so that scanty fragments only of the most highly developed plants discovered during Flinders' expedition, became known as scattered through other publications; and even in Brown's Prodromus the Victorian plants are simply indicated as from the South Coast of Australia, he counting geographically with them all those growing as far as King George's Sound.

Australian Orchids, by R. D. Fitzgerald, F.L.S. A valuable illustrated monograph of the whole of the Australian orchideous plants, comprising about 250 fairly marked species. The work is dedicated to the memory of Charles Darwin. It contains an explanatory index, literary, etymologic and geographical, noting also the time of flowering. The full-sized figures, are beautifully colored, and accompanied by ample analytic details of the various genera and species.

Mention must be made of some of the very valuable books written by the late Baron von Mueller, who was Government Botanist of Victoria for more than 40 years.

Eucalyptographia, 1878 to 1884, is a work of great value, as it contains illustrations and full descriptions of each species of Eucalypt.

Myoporinous Plants of Australia. This is mainly delineations of each Australian species, comprising 74 illustrations.

Census of Australian Plants. A compilation of all the plants indigenous to Australia; their arrangement, classification and distribution.

Select Extra-Tropical Plants. A volume containing information on plants for industrial culture.

Notes on Papuan Plants, 1875 to 1890.

Key to the System of Victorian Plants. Parts I. and II. This is a useful key for facilitating the study of our native flora.

Iconography of Australian Species of Acacia, 13 decades. A useful work, showing drawings and anatomy of Australian Acacias.

Iconography of Australian Salsolaceous Plants. With drawings and anatomy.

Among other publications of this voluminous writer are:—

Fragmenta Phytographiae Australiae, two parts; *Australian Mosses, Plants Indigenous to the Colony of Victoria, Plants of Shark's Bay*, and *Forest Resources of Western Australia*.

Botany of Captain Cook's Voyage, three volumes. These volumes contain reproductions from the plates engraved from drawings of plants collected in Australia by Banks and Solander during Cook's First Voyage, in 1768-71, and the descriptions which were drawn up by Solander, during and after the voyage. The Australasian collections are represented by 412 sketches; from these 362 finished drawings were prepared, of which 340 were engraved.

THE LILAC LEEK-ORCHID.

The Lilac Leek-Orchid, described by Dr. Rogers in 1923, is named after a member of our Club, Mrs. Edith Coleman, who is specialising in the study of Australian orchids. The type of *Prasophyllum Colemanae* (Rogers) was collected at Bayswater, 12/11/22. Mrs. Coleman gives the following condensed description of the species:—

Moderately stout, with a rather loose spike of about 21 lavender or lilac flowers. *Dorsal sepal* greenish, the conical point recurved or erect. *Lateral sepals* green, fluted, spreading, very divergent. *Petals* lavender, with a narrow green central stripe, spreading. *Labellum* lavender, margins crenated, widely ovate, nearly sessile. *Column* short, lateral appendages, oblong, falcate and lavender tinted. Another purplish.

Plate III.

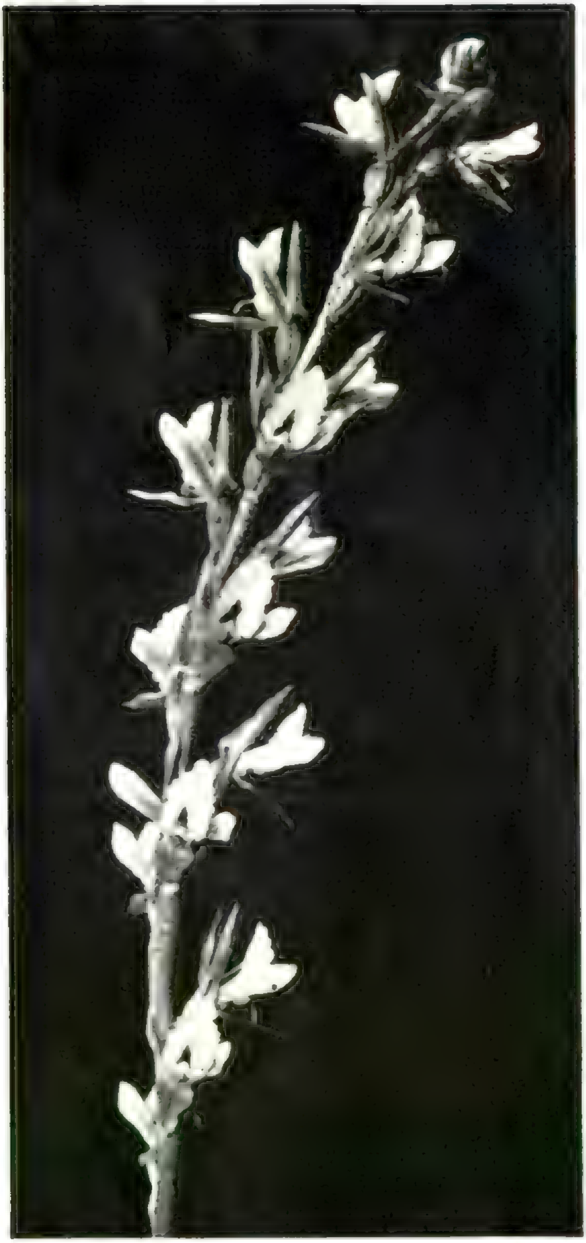


Photo. by T. Greaves.

LILAC LEEK-ORCHID, *Prasophyllum Colemanae* (Rogers)

(Twice Natural Size.)

VICTORIAN FERNS

BY H. B. WILLIAMSON, F.L.S.

Part VIII.

Genus ASPLENIUM.

This genus is distinguished by having the sori under an elongated indusium, like a narrow flap along the veins diverging from the midrib. The indusium opens upwards, *i.e.*, on the side facing the midrib.

ASPLENIUM BULBIFERUM, Forst. Mother Spleenwort. (Fig. 1.) All States, except W.A. and N.A. All continents except Europe. Fronds rise 1 foot to 2 feet, from a thick rhizome, and are bipinnate, often bearing at the ends of the pinnae bulb-like swellings (proliferous growths) from which new fronds sprout, and, becoming detached, produce independent plants. Primary pinnae numerous, usually 4 to 6 inches in length. Pinnules about 1 inch in length, toothed or lobed, with a single veinlet to each tooth or lobe. Sori attached to the veins of lobes, with a prominent cover thrown over towards the margin, so as to make the sori appear almost marginal. A dark green, rather tender fern, found in all districts of Victoria, but the North-West. Fig. 1 shows the stalk of a frond with one pinna, the upper end of which is turned over to show the upper side and the attachment of one of the bulb-like processes.

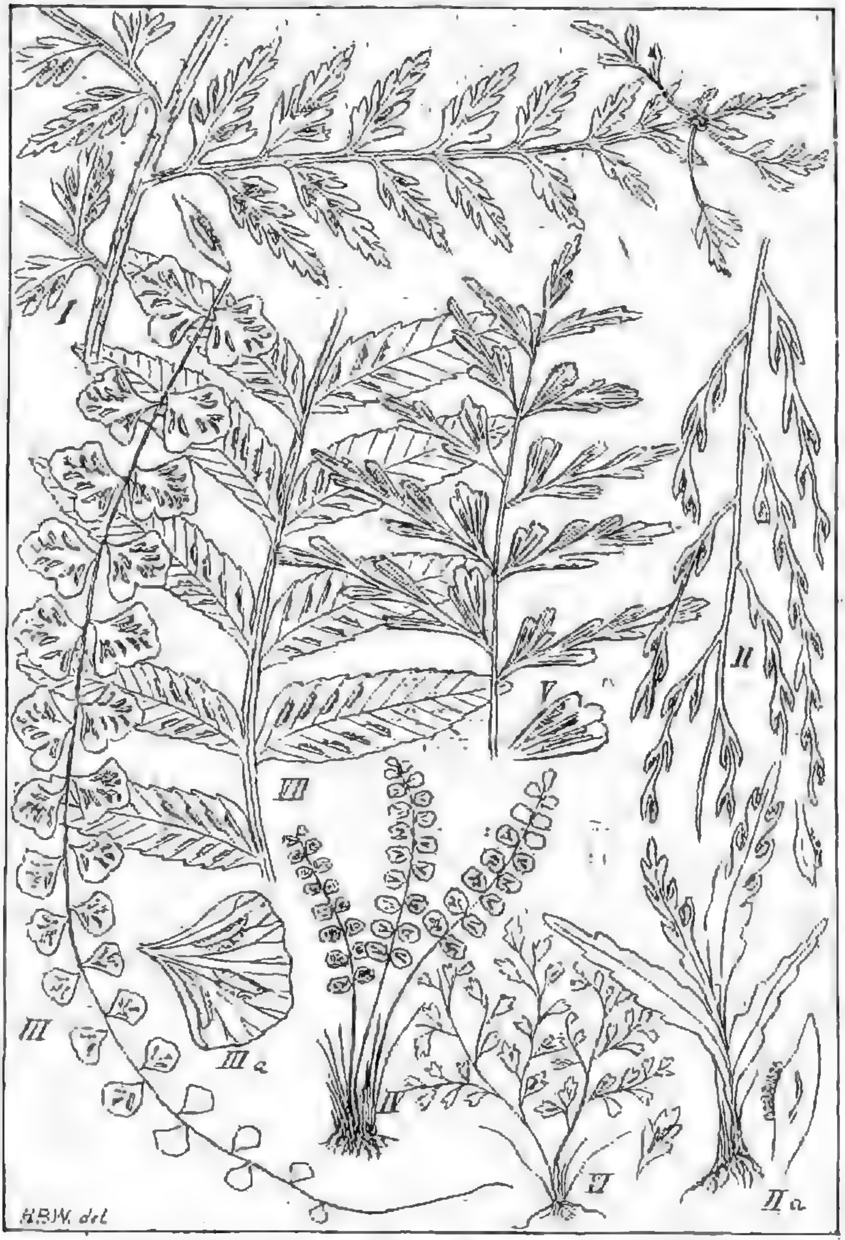
ASPLENIUM FLACCIDUM, Forst. Weeping Spleenwort. (Fig. 2.) N.S.W.; Tas.; N.Z.; Af.; Polynesia. A pale-green, glabrous fern, found often pendent from tree-trunks. In New Zealand this fern is represented by 5 or 6 very divergent forms, "from the great pendulous frond hanging three feet from a tree-trunk, to the stiff, upright, spiky little plant a few inches high." In this State the extreme forms are represented except, perhaps, that the pendent form is scarcely as luxuriant as in New Zealand. The fronds are from 1 foot to 2 feet, and pinnate. The pinnae are very narrow, barren ones toothed, fertile ones with lobes about ½ inch in length. The sori resemble those of *A. bulbiferum*, but the conspicuous indusium is thrown over so far as to make them appear marginal, and often they become visible from the upper side of the frond. Found in the South and East of the State.

APSLENIUM FLABELLIFOLIUM, L. Necklace Fern. (Fig. 3.) All parts of Australia except N.A. Not known outside Australia and New Zealand. This is the long, necklace-like fern, which is found in all districts of the State, but the North-West, trailing from shelves in rocks, with fronds sometimes a foot in length, with small, fan-shaped pinnae, and the end of the rachis or stalk often produced to some length bare of pinnae. The pinnae are short-stalked, obliquely fan-shaped, bluntly-toothed and sometimes three-lobed, up to 1 inch in length and breadth. The sori, usually 7 to 9 to each pinna, are along the diverging veins, and the indusium is conspicuous, and opens towards the midrib. Fig IIIa shows the typical indusium of *Asplenium*.

ASPLENIUM TRICHOMANES, L. Common Spleenwort. (Fig. 4.) Vic.; N.S.W.; Tas.; N.Z., and all continents. This resembles *A. flabellifolium* in having pinnate fronds with small roundish segments, but it is a small, tufted plant, with black, rigid frond-stalks, and less membranous segments, which are always sessile, somewhat like *Lindsaya linearis.* The fronds are from 2 to 6 inches in height, and the pinnae about ¼ inch in length and breadth. Sori few, 4 or 5, on diverging veins, distinct when young, uniting in a circular mass when old. There are specimens from Buffalo Mts., Upper Murray (Cobberas, H.B.W.), and the Grampians. Recently Mr. C. Barrett collected it from rocky banks of the Glenelg River, at Dartmoor.

ASPLENIUM PRAEMORSUM, Sw. (*A. furcatum*, Thunb.) Forked Spleenwort. (Fig. 5.) Vic.; N.S.W.; S.A.; W.A.; and all continents except Europe. Fronds are 6 to 18 inches high, with pinnae mostly 1½ to 2 inches long, deeply notched, or even pinnate. The segments are wedge-shaped, notched at the end, prominently streaked with few diverging veins, and of a leathery texture. The sori are long and straight. This species appears to have been collected only at Darlot's Creek, near Portland (Allitt). The record for "Grampians" is probably a mistake, for Mueller erroneously records Darlot's Creek as in "Grampians District."

ASPLENIUM HOOKERIANUM, Col. Maidenhair Spleenwort. (Fig. 6.) N.S.W.; N.Z. only. A small, tufted fern, rarely above 6 inches in height, with pinnae ½ to 1 inch in length, consisting of 6 to 10 distinct, oblong-



(I-VI) ASPLENIUM

cuneate dentate segments rarely three lines in length. Sori usually 1 or 2 on each segment. Advanced fruiting specimens with the sori almost covering the segments somewhat resemble the larger forms of *Anogramma leptophylla,* which fact may have led to the record for "Colac Ranges," from which locality no specimen can be found in the National Herbarium. It is doubtful indeed whether it has ever been gathered in the State, as the record, "N.E. Upper Hume River," refers to New South Wales, as well as to Victoria.

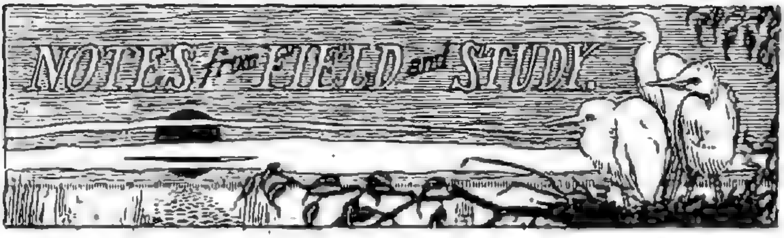
ASPLENIUM OBTUSATUM. Forst. Shore Spleenwort. (Fig. 7.) N.S.W., Q., Tas., N.Z., all other continents. A remarkable sea coast fern, with fronds 6 inches to a foot in length, pinnate, and of a leathery texture. The pinnae are 2 or 3 inches in length, and up to 1 inch in breadth. This fern is common on the North Coast of Tasmania, and on the islands of Bass Strait, and may yet be found on the Victorian coast. As its record for Victoria depends on specimens gathered on the New South Wales coast north of Cape Howe, the name of this fern should be deleted from our Census.

ORCHID SECTION OF THE CLUB.

A meeting of those interested in the study of Victorian orchids was held in the National Herbarium on June 29th. It was resolved that an Orchid Section of the Victorian Field Naturalists' Club be formed, any person interested to be accepted as a member, such person to be nominated and seconded by a financial member of the Club; that the annual subscription (to cover expenses) be 2/6, to be paid to the Honorary Treasurer of the Club, and held for the use of and by the Orchid Section. It was decided further, that the Section meet at the National Herbarium on the first Wednesday of each month, the next meeting to take place on Wednesday, August 4th.

The aims of the Orchid Section, it was agreed, should be—(1) To partake in the intensive study and protection of Victorian Orchids; and (2) the diffusion of knowledge regarding them—in description and illustration.

A Sub-Committee of six members of the Club was elected, namely, Mr. E. E. Pescott (Chairman), Mrs. E. Coleman, Messrs. C. French, Jnr., H. B. Williamson, W. H. Nicholls, and P. Morris (Secretary). This Sub-Committee has power to act in matters of jurisdiction, and will finalise the work of members of the Section. Officers will be elected annually.


NOTES from FIELD and STUDY.

THE SPANGLED DRONGO.

Recently, in the *Naturalist* (Vol. xliii., No. 3), mention was made of the Spangled Drongo, *Chibia bracteata,* and of its scarcity in Victoria. This curious bird has not only been seen and heard on many occasions, but has been nesting on Sperm Whale Head for several years. Five or six years ago, when walking through a clump of Coast tea-tree, *Leptospermum laevigatum,* on our property, I noticed a nest in the fork of a slanting branch, about 7 feet from the ground. The nest was composed chiefly of slender tea-tree twigs, and lined with bark and feathers; it contained three young birds, evidently hatched a few days previously, as they were still clad in very dark, almost black, down.

The parent birds were not present then, but half-an-hour later, one was seen on the nest; becoming aware of my presence, it was off in a flash. At the time I did not know that the Drongo existed in the locality, so could come to no conclusion as to the identity of the bird. Some three years later, in the same locality, I was attracted by some most unusual notes, but the singer was extremely shy, and not easily observed. Its favourite perch was the top twig of a dead *Banksia*, from which it uttered its own curious notes, and mimicked those of other species. While thus engaged, it paid very little attention to what was happening around it.

Eventually I obtained sufficient notes on the habits, color, etc., definitely to identify this bird as the Spangled Drongo. Since then I have become quite familiar with the species; and in 1924 I found a nest, containing five young birds. Both the nest and young were similar to those found several years before, and I feel certain that the Drongo was the bird that puzzled me then. Probably it has nested there every year I have no doubt that Drongos migrate northwards in the autumn, and spend the winter in New South Wales and Queensland, as I have noticed them here only during the spring and summer months. During the coming spring I hope to make fuller observations on their nesting and other habits.—FRED BARTON, Junr.

PLUMAGE OF BLUE WRENS.

Since John Gould wrote on the winter change of plumage of the Blue Wren (*Malurus cyaneus*), many other ornithologists have recorded their observations, confirming those of the great birdman. However, a close study of Blue Wrens, extending over many years, has convinced me that few, if any, of the males lose their bright plumage during winter. I have had ample opportunities of observing these birds in our garden at Ripponlea, to which a small party came more than five years ago. The male has retained his plumage every winter, and at no time of the year does the plumage lose its brightness. At present the other Wrens in the garden are dull-colored birds, one being a young male with blue tail feathers.

The short, thick scrub along Gardiner's Creek is a favorite haunt of Blue Wrens. Here several small parties have their homes, each being accompanied by a male in bright plumage. These males are to be seen in their usual dress throughout the year. In the early stages young males are similar to the females. The first male adornment is gained in winter, when the tail feathers become bright blue, then, in spring, the lovely blue livery is assumed.—D. DICKISON.

CARPET SNAKE'S MEAL.

In the Cairns district, Queensland, recently, I saw a Carpet Snake, *Python variegatus*, which had just swallowed a full-grown wallaby. The snake, with enormously distended abdomen, was unable to move its body from the "meal-point" backwards; but the front portion was active. The head was swinging round as if on a pivot. About five feet of the body was slender and sinuous; then came the bulky part, where the wallaby lay; beyond this barrier, normal snake again—the tail was curled. Two Italians shot the poor reptile, whereupon it disgorged its meal. The wallaby was about 3 feet in height; its bones were broken, but otherwise it seemed to be uninjured. I was informed that carpet snakes sometimes attain a length of 20 feet or 21 feet.—C. BORCH.

"TWO RARE NATIVE MOUNTAIN HEATHS."

In the article under the above title, published in the *Naturalist* in April last, the geographical distribution of these two plants was described as strictly limited, growing only on the Baw Baws.

Mr. A. J. Tadgell now informs me that he had in his collection a specimen of *Wittsteinia vaccinacea,* collected by the late Charles Walter in the N.E. Alps. The specimen is now in the National Herbarium. That locality must therefore now be added for this plant.

Mr. Tadgell further states that he himself collected *Epacris Bawbawensis* also on the N.E. Alps, from the following mountains:—Buffalo, Feathertop, Hotham, Pilot, and Bogong. Thus also, the distribution of this Epacrid must be extended on our lists.

Mr. Tadgell is of the opinion, and this is confirmed by Mr. J. W. Audas, F.L.S., that this Epacris is synonymous with *E. paludosus.*—E. E. PESCOTT.

NEW SPECIES OF DRYOPIDAE.

In the *Proceedings of the Linnean Society of N.S.W.,* Part II., 1926, Mr. H. J. Carter deals with several species of beetles belonging to this family. The insects, until quite recently, were known as PARNIDAE, but an earlier generic name has been brought to light and so, according to the Law of Priority, the family name becomes DRYOPIDAE.

In 1864 the Rev. R. L. King named seven species from New South Wales; since that time the group has been almost wholly neglected by entomologists. Some species of these beetles may be obtained in numbers; but owing to their mode of life, they are never found unless sought for specially. They pass their existence on submerged pieces of wood and stones, in streams, and, owing to the development of their claw-joints, which are very long, and furnished with two long, sharp-curved claws, they can retain their hold even in the rushing water. I have taken specimens from a piece of timber exposed to the full force of a small waterfall.

Recently Mr. Chas. Barrett and myself, in Victoria, and Mr. Carter and one or two other collectors, in New South Wales, have made a special point of searching for DRYOPIDAE, and the results have furnished most of the material for Mr. Carter's paper. All the new species, except one, belong to the genus *Helmis* (formerly *Elmis*). The Victorian representations are: *Nicholsoni*, from Ferntree Gully and Warburton, with a well marked variety, *bicolor*, from the upper reaches of the Dee, at Millgrove; *aerata*, a small species, also from Ferntree Gully; *angustata*, from Victoria, but exact locality uncertain; *quadriplagiata*, a very common beetle, from several localities near Melbourne; and *Wilsoni*, a tiny species, which I secured from beneath a large stone in the George River, at Lorne. Two other species are also described from New South Wales, and one, belonging to the genus *Hydrethus*, from Queensland.

All the known species have been found only in the eastern States and Tasmania, but possibly, if a close search were made, DRYOPIDAE might also be discovered in South and Western Australia. In October, 1925, when collecting near Port Augusta, S. Aust., I looked for DRYOPIDAE in a small permanent stream, but without success.

In addition to the new species described by Mr. Carter, one of the earlier named species, *Tasmanica*, Blackb., is also a fairly common beetle in our State; and at least one of King's species was described as coming from the Murray River.

As the collecting done by Mr. Barrett and myself has been mainly confined to streams not very far from Melbourne, it seems likely that other forms will be found when the more distant rivers and creeks have been carefully prospected for specimens.—F.E. WILSON.

"KEEPING" BIRDS.

Some so-called bird lovers may learn a lesson, if they will. I contrast two methods of "keeping" birds.

My neighbor for two years past, has kept a Rosella (*Platycerus eximius*) in an enclosure, some six feet square; and, I do not doubt, he considers that the bird has its liberty. Why he keeps it I have long wondered, as it does not give him even the proverbial "Pretty Joey." When he does not forget the bird, he calls to it, and it responds to his whistle with "pea wee." Mostly the bird passes its time in solitude and semi-darkness, as part of the cage for about half the height from the top is boarded down, for protection against bad weather and for shade in summer. Pointing to an English thrush, brimming over with melody, that we see on the topmost branch of an adjoining gum tree, or to a Grey Thrush (*Colluricincla harmonica*), in the tea-tree near by, I say: "How can a bird be kept in captivity and so made unhappy?"

Now for the other side of the picture. Some people near Wandin "keep" a young Major Mitchell Cockatoo (*Cacatua leadbeateri*), which was sent them from the Mallee. The bird has always had his liberty, is happy, and keeps about his new home. At night he retires to a tree, *Eucalyptus macrorryncha*, close to the house, and calls in for his breakfast of warm, steeped biscuit, each morning. He has a preference for arrowroot biscuit, but if given a currant luncheon, carefully rejects each currant. On a recent week-end visit, we had walked a quarter of a mile from the house, when the cockatoo flew over our heads, displaying his beautiful salmon-colored crest, underwings, and breast feathers. He greeted us with "Hullo, Cocky, what!" I placed a piece of apple at my feet and as I bent down, the bird flew on to my back. Watching till I was ready, he dropped lightly to the ground. Carefully he peeled the piece of apple and left the rind. As we continued our walk, he flew round us and followed, or alighted on the post-and-wire fence, generally keeping a foot or two in advance of us, talking the while. When we were half a mile from home, he flew away.

Magpies are a cause of annoyance to the cockatoo, they pursue him at times.—A.J.T.

THE SWISS NATIONAL PARK.

One cannot but admire the exceedingly live interest taken in Switzerland, in the preservation of the scenery, fauna and flora of that country. No land is now immune from the ravages by the exploiter of animal or plant life for purposes of commerce, and when that is the collector's uppermost thought, what cares he for the scientific value or aesthetic influence of the beauties of Nature. In a young country like Australia, it is imperative that we, as naturalists, keep our eyes alert to detect any signs of spoliation of our natural beauty spots which, once lost, can hardly ever be regained. And this watchfulness over Victorian natural treasures, has in the past, been always faithfully kept by the Field Naturalists' Club. In Switzerland, there is a "League for the Protection of Nature." It has nearly 30,000 members, paying an annual sum of 2 francs, or 50 francs for a life-membership. This and other details we learn from the Hooker Lecture on the Swiss National Park, given before the Linnean Society of London by Professor Carl Schroeter.

In the précis of the lecture given in the Proceedings of that Society we are told that:—"The result up to now has been the protection of a number of mountains from invasion by railways, the preservation of 400 erratic blocks, 50 trees of special beauty, 15 fens, 20 bird sanctuaries, and districts where shooting is prohibited." Among the rules enforced in this ideal National Park are the following:—"Shooting, fishing, manuring, grazing, mowing and wood-cutting are entirely forbidden." To carry out the next rule one would have to exclude collecting botanists, for "No flower, or twig, may be gathered." No stones may be removed (is it not almost time to exclude geologists from Werribee Gorge?), "and even fallen trees must remain untouched." The general arrangements provide for huts "but no hotels." Camping and lighting fires are prohibited. The favourable effects of the preservation of this area are seen in the increase of the number of animals during seven years. The idea of a league of membership of this kind might be advocated for Victoria, if only to create a personal interest amongst the people of this State in the natural objects and treasures of their own land.—F. CHAPMAN.

NORTH QUEENSLAND SWALLOWTAILS.

By C. Borch.

Papilio ulysses and *Troides euphorion* are the most beautiful of Australian butterflies. In North Queensland recently I saw both species on the wing—a pleasure long anticipated.

The elegant Blue Swallowtail, *P. ulysses*, is moderately plentiful during some months, and has been taken in every month of the year. I found it to be most abundant in January, February, and March. Often it is called "Blue Mountain" butterfly by residents of the Cairns district. One or two of these splendid insects, fluttering about brilliant Lantana flowers, their wings flashing in the sunlight, and glowing in shade, is a sight to quicken the pulse of any nature lover. *Ulysses* often visits gardens near the scrubs.

Larvae of the Blue Swallowtail were found on a scrub tree with bright green stems and large, oval-shaped, light-green leaves. Many of the trees were tall; but the caterpillars always were taken on small specimens—about 12 feet in height. The larva of *P. ulysses* is rather handsome, and has dorsal spines, which are lost in the last moult. Light-green and white are the prevailing colours in the final instar, when the larva is decidedly like that of *P. sarpedon*.

Usually these caterpillars are found singly, or two on a plant. Each spins webbing on the upper portion of a leaf, where, apparently, it resides, only coming forth for food. The pupa is of a light-green colour, and is attached to the under-surface of a leaf, or a twig, of the food-plant. It is difficult to detect.

The Birdwing Butterfly, *T. euphorion*, our representative of the ornithopteras, although a beautiful insect in the cabinet, is a little disappointing, seen on the wing. Rarely does one get glimpses of the splendid colours, as the Birdwing wheels in sunshine. It flies rather slowly, with flapping motion, in marked contrast to the swift, alert flight of *P. ulysses*.

In company with Mr. A. Burns, a Queensland member of our Club, and an ardent collector, I searched for larvae and pupae of the Birdwing Butterfly. We discovered about 40 caterpillars and seven pupae. Our hunting-ground was on the Mulgrave River, 15 miles south of Cairns. The soil was sandy, and the vegetation, consequently, not so dense as in other scrubland areas, where the growth was too dense to be penetrated. The larvae of *Triodes* is a repulsive looking creature, dark, brownish-black (or some dark colour, for individuals vary a good deal), covered in fleshy black spines on the back and sides; when touched it projects two red tentacles behind the head (as do all Papilio larvae that I have seen), and emits an offensive odour. The food-plant is a species of *Aristolochia*, a climber which covers small shrubs, tree-trunks, etc.

The larvae of *Triodes* are, apparently, great wanderers from "home." We saw one on a "foreign" plant, but could not discover the food. One or two specimens, usually, are seen on a plant. The pupa, invariably, is attached to the under-surface of a leaf, either near, or at some distance from, the food plant.

I stayed for several weeks at the home of Mr. and Mrs. Burns, and it is owing to their kindness that many of my specimens were secured. We spent many happy days insect-hunting in the scrub.

[On Dunk Island butterflies abound, and there I saw dozens of Swallowtails, *Ulysses*, and the Birdwing. One of the finest prose passages in Australian literature is the late Mr. E. J. Banfield's description of the love-flight of *Ulysses*, a species that was first observed, in Australia, on Dunk Island, more than fifty years ago. The love-making of the green and gold and black *Ornithoptera*, that "gem" among Queensland butterflies, has also been finely described by "The Beachcomber." Butterfly wings gleam on many pages of his books.—C.B.]

NOTES ON A SPIDER.

An American writer states: "We are so ignorant of the intricacies of entomology that we can learn much by a study of the common things at our very doors." On February 22 I observed, on a small branch of a plum tree in my garden, eight globular egg-cases, of the texture of paper, each nearly half an inch in diameter, light brown in color, with umber markings crossing each other irregularly, or splashed on here and there as casually as the markings on a Chinese lottery ticket. There were two groups of three and of five cases respectively, all strung together by web, and ingeniously attached to the branch by threads or strands of web, which securely held them in place.

I counted nine cases subsequently, and spread out on two, so as to appear amorphous in character, was the mother spider (*Selena excavata*), immovable, and apparently oblivious of her surroundings.

The thorax, head and legs were black, the back a whitish or greyish splotch, the whole attitude and color scheme evidently an instance of protective adaptation in imitation of the dropping of a bird.

The spider was abnormally swollen in the abdomen, although seeming to take no nourishment. It remained in the same cramped position, apparently, for days, occasionally changing over to different egg-cases, to which it attached itself persistently, or else retreating to the lower side in extreme heat. For a fortnight there was no change, except that in the upper case appeared a small puncture, the other cases being intact.

Was this continued brooding simply to protect the cases during the process of incubation, or did it also assist in the same? Was the striped marking a means of recognition, or a further protective device? These questions suggested themselves; and also I wondered whether the spider would be able to assume the care of such a prospectively numerous progeny, or would after her apparently self-inflicted hunger strike, ease her parental task by devouring the weaklings among her offspring as she had probably done with her mate.

Frequent visits for observation showed no alteration for nearly two weeks, until, on March 10, another case was added, making 10 in all. The case was placed in position during the night, without any preliminary preparation. Observing the spider at night, on March 12, I found her set position relaxed, and the legs extended. A large moth was suspended at one side; of this, in the morning, there was not a vestige. Next day a number of young spiders, like specks of wool, were seen dropping from the upper case on invisible threads. Again on the night of the 14th, the spider was in an easy position and had another large moth for the larder hung up like a carcase in a butcher's shop. This moth had also completely disappeared in the morning. It was evident that the spider seized its prey at night, perhaps stalking it, as no web is made for entrapping insects.

Another egg-case joined the family circle on the 19th. A few days later another batch of little spiders made parachute flights; and at night again, a moth had been captured. On the 23rd the spider had disappeared, and I thought that a sharp-eyed sparrow had detected the camouflage; but on the following morning it was in its usual place and attitude.

On March 28 the 12th egg-case appeared, and a month later, April 30, the total was 13. This last brown ball was slightly smaller than the others, and it appeared that Selena was tiring of the game. Six cases were now perforated, but she clung as closely and constantly as ever to the others. Once again some animated specks of wool disappeared into space, and another month passed without any variation to break the monotony of the patient waiting and watching.

On June 9 the spider was on duty, but next day her place knew her no more, nor has she reappeared. Except for one noticeable absence, she had by day immovably maintained her place on the egg-cases for about four months under observation, and probably for three months before the first date mentioned.—C.D.

THE LADIES' COMMITTEE.

The great success of our Wild Flower Shows has been very largely due to the excellent work done by our lady members and friends, who have given so freely of their time and services to crown our Show efforts. I would ask again the hearty co-operation of all our Lady workers in making this Show the best we have ever had. Would all of those who can make it at all possible, kindly attend the next meeting, so that all arrangements necessary can be made to carry out the Ladies' programme?

The Secretary will be glad to hear of help from any Lady who finds herself unable to attend the meeting.—THE PRESIDENT.

The Victorian Naturalist

Vol. XLIII—No. 5. SEPTEMBER 7, 1926. No. 513.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall, Victoria Street, on Monday evening, August 9th, 1926. The President, Mr. E. E. Pescott, F.L.S., occupied the chair, and about 70 members and friends were present.

CORRESPONDENCE.

From Mr. F. Lewis, Chief Inspector of Fisheries and Game, stating that he was giving attention to the matter of Sherbrooke Gully and Forest, with a view to the area being proclaimed a Sanctuary.

From Department of Lands and Survey, stating that the Club's request that the "Dandenong Police Paddock" be reserved as a Public Park had been recorded.

From Combined Progress Associations of the Shire of Fern Tree Gully, inviting the President to attend a Conference in regard to Sherbrooke Gully at Belgrave on September 18th.

It was resolved that the President should represent the Club at the Conference.

REPORTS.

A report on the visit to the National Museum on July 24th was given by Mr. C. Lambert.

ELECTION OF MEMBERS.

On a ballot being taken, the following were elected as ordinary members:—Mr. Geo. Hawkins, Winmallee Road, Balwyn; Mr. M. J. Woodhouse, 34 Andrew Street, Windsor; Miss I. Wilkinson, Police Department, Melbourne; Miss M. Carlile, Town Hall, Melbourne; Miss A. Malesky, Vauxhall Road, Canterbury; and Misses E. L. and H. O. Keartland, 66 Gipps Street, East Melbourne.

GENERAL.

The Hon. Secretary read the minutes of the monthly meeting of the Orchid Section of the Club, held at the Herbarium on August 4th.

Mr. F. Pitcher moved that in view of the Club's decision to donate part of the proceeds of the Wild Flower Show to the Children's Hospital Appeal, the Hospital be asked to co-operate in obtaining supplies of flowers, and rendering assistance at the Show. Miss Gabriel seconded the motion, which was carried.

PAPERS.

A New Victorian Orchid, by Mr. W. H. Nicholls. This paper was read by the President, who referred to the valuable work Mr. Nicholls had done on these plants.

Rambles in the Lorne District, by Mr. L. L. Hodgson. The paper was illustrated by lantern slides.

EXHIBITS.

By Mrs. E. Coleman: Growing plant of *Dendrobium aemulum* (R.Br.), "White Feather Orchid," showing nine healthy racemes. This orchid flowers in September, and grows on trunks of lofty ironbarks, red box, or on sassafras trees, in mountain gullies. (Collected by Rev. H. R. M. Rupp, on Hungry Mt., N.S.W., 21/16/1926).

By Mr. F. Chapman: Specimen of *Acacia longifolia,* Sallow Wattle, cultivated at Balwyn.

By Mr. H. P. McColl: Specimens of cultivated native flowers.

By Mr. J. Searle: Two small colonies of Termites (2 species) from the Mallee.

By Mr. E. E. Pescott, F.L.S.: Cultivated specimen of Bushy Heath Myrtle, *Thryptomene ciliatus,* Stapf, (*Mitchelliana,* F.v.M.).

By Mr. H. P. Dickens: Coloured drawing of group of orchids.

By Mr. L. L. Hodgson (on behalf of Mr. C. W.D'Alton, Hall's Gap): Chip found inside an old stringy-bark tree in the Grampians. The following note by Mr. D'Alton was read:—

"The old axe marks were first noticed after cutting through six inches of solid red timber on a large tree growing near the edge of a water course. Experienced bushmen declare that the cutting must have taken place at least 80 or 90 years ago. As this would be near the route taken by Major Mitchell while travelling from old Pleasant Creek to Mt. William, it is quite possible that some members of the party of explorers camped on the bank of this water-course."

RAMBLES IN THE LORNE DISTRICT.

BY L. L. HODGSON.

(Read before the Field Naturalists' Club of Victoria, August 9th, 1926.)

In December, 1925, I spent a short vacation at Eastern View, in the Lorne district, the locality being reached by way of the Great Ocean Road. The country passed through between Geelong and Anglesea presents few features of outstanding interest. Shortly after leaving the township, a long, narrow spit of land, or low sandstone cliff, is seen, running out in a curve for some distance to sea, and forming a charming little bay. Looking back towards Anglesea from this point, the sheer sandstone cliffs, which show evidence of erosion due to wave action, are a striking feature. A few miles further on, the road winds through a large clump of Red Ironbarks (*Eucalyptus sideroxylon*). Grass-trees (*Xanthorrhœa australis*) here make their appearance and continue, as a distinctive feature of the vegetation, for some miles.

Some distance beyond Airey's Inlet, Mogg's Creek with its Tea-tree fringed banks, is crossed, and, after following the sea-shore for about two miles, Eastern View is reached, whence a fine sandy beach extends the whole distance to Airey's Inlet, four miles eastward. A narrow belt of Tea-tree (*Leptospermum lævigatum*) separates the beach from the hills, which rise sharply to the north of the road, and are covered with a dense growth of stunted Eucalypts, from 6 ft. to 10 ft. in height, forming an almost impenetrable barrier. An interesting feature of the sea-shore at Eastern View, is a reef of brown coal, which is exposed at low tide, and indicates the existence of a carboniferous area.

Just beyond Eastern View, the road has been cut out of the face of a hill, which drops steeply to the beach, and on the far side of which is a sharp hairpin bend, known as the Devil's Elbow, where the road turns inland, hugging the side of the hill above Grassy Creek. After crossing this creek, the climb up the slopes of Big Hill is commenced, a height of 300 feet above sea level being soon attained. On the seaward side, the cliff falls precipitously to the rocks below, over which the rollers break ominously at high tide, there being no beach at this point. Some splendid panoramic views of the coast towards Lorne are obtained while traversing the road under the brow of Big Hill, for the next two miles. Another dry creek-bed is crossed, and a series of hairpin bends negotiated, before the road runs on an easy grade to Lorne.

The country surrounding Eastern View affords opportunities for several interesting trips, the most important being that up the valley of Grassy Creek to the Louise Falls. This stream meanders through very hilly forest country, the timber consisting principally of Blue-gum (*Eucalyptus globulus*), Messmate (*E. obliqua*), and Manna-gum (*E. viminalis*), with a sprinkling of Red Ironbarks (*E. sideroxylon*). The track follows the course of the creek fairly closely, at times rising sharply over a spur to avoid a detour, and often descending to the creek-bed, which is crossed and recrossed at frequent intervals. After traversing some three miles in this manner, a somewhat longer climb than usual brings one to a position on a steep slope overlooking a small gorge, known as McCormack's Canyon. The bed of the creek is seen 150 feet below, and on one side a perpendicular cliff rises to a height of perhaps 80 feet, while on the opposite bank many tree-ferns flourish in the damp soil. The track continues along the side of the hill for some distance, and a glimpse is obtained of the lower falls, which, however, are hardly worth the effort entailed in scrambling down through the rough undergrowth to obtain a closer view. A few hundred yards above these falls, a descent is again made to the creek, at a spot which provides ample facilities for camping purposes.

Following the somewhat ill-defined track for another mile or two, the entrance to Herschel's Fernery is reached, and a sharp descent brings one into the midst of a mass of magnificent Soft Tree-ferns (*Dicksonia antarctica*) luxuriating in the moist conditions which here prevail. These ferns grow in great profusion for a mile along the banks of the stream, the track winding in and out among their trunks, on which many lesser ferns, such as Maiden-hair (*Adiantum aethiopicum*), Kangaroo Fern (*Polypodium diversifolium*) and Spleenwort (*Asplenium*) find a congenial root-hold, in association with various mosses. The water's edge is also fringed with many water-ferns (*Blechnum capense*), and the scene is one of great beauty. This locality is not, as yet, well-known, and has consequently not suffered from the depredations of the selfish and thoughtless tourists, who appear to delight in uprooting and carrying off these beautiful plants.

At the farther end of the Fernery, the track suddenly terminates at the foot of a 50 ft. cliff, over which the water dashes and falls in a shower of spray into a large pool, before it ripples away over its stony bed to the sea. The cliff-face is not perpendicular, but curves inwards, and thus forms a cave behind the falls. It consists of a sandstone formation, the layers of which can be easily dislodged, and a little diligence and keen observation may be rewarded by the finding of specimens bearing leaf impressions of the Jurassic era. A tree was observed at this spot, bearing some initials, and a date in the early Eighties; but the ravages of time had partly obliterated the lettering, making it very difficult to decipher.

Little of outstanding interest from a botanical point of view was observed at the time this trip was undertaken, but the following plants were noted:—Austral Mulberry (*Hedycarya angustifolia*), Musk Daisy-bush (*Olearia argophylla*), Christmas-bush (*Prostanthera lasianthos*), Tough Riceflower (*Pimelea axiflora*), Derwent Speedwell (*Veronica Derwentia*), Hazel (*Pomaderris apetala*), Golden Tip (*Goodia latifolia*), Hop Goodenia (*Goodenia ovata*), Blanket-leaf (*Bedfordia salicina*), Kangaroo Apple (*Solanum aviculare*), in addition to a few isolated specimens of the Blue Pincushion (*Brunonia australis*). Birds were very scarce, but a flock of Black Cockatoos (*Calyptorhyncus funereus*) was observed feeding in the tree-tops, to the accompaniment of much screeching.

Another interesting, but shorter, trip is that to Shelly Beach, under Big Hill. This is reached by a steep zigzag track leading down from the Ocean Road, on the Lorne side of the Hill, and a few hours might be profitably spent in sifting through the heaps of perfect and broken shells which litter the narrow strip of sand. Cowries and many other small shells may be found here in profusion.

The return to Eastern View may be varied at low tide by keeping close under the lee of Big Hill and scrambling over the masses of rocks, which are a feature of the coast. These rocks are of a sandstone formation, and many small, hard knobs appear as excrescences on their surfaces, the softer portions having been gradually worn away by the action of the elements. At short intervals, the force of the waves has scooped deep gulches or fissures in the solid rock, up which the rollers dash with great violence, and effectually prevent progress at high tide. A large cave, which penetrates the foot of Big Hill for about 50 ft. hereabouts, is of interest.

Good fishing is obtainable off the rocks in this vicinity, a fish known locally as Rockies, being fairly plentiful and easily caught; the flesh is somewhat soft, but good eating. Other fishes found in these waters are Sweep, Schnapper, "Bluenose," Salmon Trout and Flounders. The two latter varieties, however, prefer the sandy beaches to the rocks, and are usually caught with the aid of a drag-net when weather and tidal conditions are favourable. Porpoises sometimes visit these shores, and a number was, on one occasion, observed disporting close in-shore; they appeared to perform a series of strange evolutions, now the head and then the tail showing above the surface of the water.

In addition to the coastal road, there is a route around the back of Big Hill, which has been formed by widening the old bridle-track to Lorne, and which rejoins the Ocean Road near a small creek-bed on the far side. The only feature of particular interest along this back track is a number of Ironbarks, which form a fine natural avenue.

One of the finest coastal walks in the district is that to the Cumberland River, some five miles to the west of Lorne. The bridle track has been cut on an easy grade, well above high tide level, and, in rough weather, heavy seas break on the rocky coast below. The first section of the track, about a mile in length, follows a timber tram-line as far as the St. George River, a fair sized stream at its mouth. The western slope of Teddy's Lookout, on which is a zig-zag foot-track, drops steeply down to the river, while on the opposite side of the valley, the eastern declivity of Mt. St. George rises abruptly to the summit, 650 feet above sea level. Crossing the St. George River on a substantial foot-bridge, the track skirts the Mount for some two miles, when a break in the hills indicates a watercourse; this proves to be the Sheoak River, a much smaller stream than the St. George, and is crossed by means of stepping stones. Some distance up this creek are the Swallow Caves, in which are a great number of nests.

Pushing on round the slopes of "The Brothers," two hills of similar appearance, in close proximity, the track shortly descends to the left bank of the Cumberland River. This is also a smaller stream than the St. George, averaging 8 feet to 10 feet in width, except at its mouth, where its widens considerably. The scene looking up the Cumberland Valley is one of grandeur, suggestive of parts of the Grampians. On the right hand, rugged cliffs mount perpendicularly to a height of 100 feet, from the top of which a steep slope leads to the foot of another precipitous wall of rock rising to the peak "Scaw Fell." To the left, the rugged slopes of Langdale Pike ascend to a sharp rock-crowned point, whilst between these two eminences, the river ripples and gurgles over its boulder-strewn bed.

Perhaps the most favoured inland trip in the Lorne district is that up the Erskine River to the Erskine Falls. This river runs into the sea on the eastern outskirts of the township, and makes a picturesque scene, with its rows of big Eucalypts growing on either bank, and spreading their branches over the waters. A short distance upstream, a wide, shelving mass of dark rock intrudes across the river bed, over which the water rushes impetuously, forming "The Rapids." A well-worn foot-track closely follows the course of the stream, which is crossed frequently, stepping-stones marking the way. Altogether, 29 crossings were counted in the course of the six miles between the starting point and the Falls. The sloping banks are, for the most part, well clothed with varied vegetation, including tree-ferns, interspersed with many Eucalypts (principally *E. viminalis*) and Blackwoods (*Acacia melanoxylon*), some of which grow at the water's edge, their branches forming a canopy, shading the fern-fringed pools. At intervals, rocky cliff-faces rise sheer from the water, proving an insurmountable obstacle to the rivers' progress, and compelling it to seek an outlet in another direction.

On approaching closer to the Falls, the tree-ferns increase noticeably in size and number, their stems being often covered with Kangaroo Fern, and various mosses. A less happy note is struck by the masses of uprooted tree trunks, logs, and other debris, which, here and there, piled high in midstream, bear testimony to the devastating effects of the violent floods of recent years. The course of the stream has, in some instances, been diverted into fresh channels by these obstructions; in one place the river has branched, leaving an island between the two arms, on which several fair-sized trees are thriving. A mile or so below the Erskine Falls, Splitters Creek joins the main stream, and, by a deviation of a few hundred yards, a good view of Splitter's Falls may be obtained. These Falls are not very impressive, as they consist of a series of long narrow bands of water dropping from rocky ledge to ledge, until they are lost under the rubbish with which the stream bed is strewn.

Returning to the Erskine, the track, which is in places obliterated by piled-up driftwood, necessitating a scramble or a detour to make progress, leads to the camping ground, a beautiful bower among the tree-ferns. Here the alternative route from Lorne, via the upper road, junctions with the river track. A half-mile further on, Straw Falls, little more than a trickle over a bare face of rock to the right, are passed, and very soon, the famous Erskine Falls come into view. Seen through the over-hanging foliage, the falling water, glistening in the sunlight, makes a charming picture in its setting of innumerable small ferns and mosses, which cling to the crevices in the cliff-face, and flourish in the constant spray. Much of the primeval beauty of the surroundings has, however, evidently been destroyed by the numerous sightseers, who annually visit this locality. While we were there, one woman was observed carrying off an armful of ferns which, despite the regulations prohibiting their removal, she had ruthlessly uprooted in the vicinity.

Owing to the time of year, only a limited number of plants were found in bloom. The flora is not in such variety as is found in some parts of the State, but the ferns and mosses are equal in luxuriance and profusion to those of other notable localities. The description of the vegetation met with on Grassy Creek and the Erskine River applies generally to the forest country inland.

On the sea-front, specimens of the Cushion Bush (*Calocephalus Brownii*), Sea Box (*Gynopogon buxifolius*), Coast Beard Heath (*Leucopogon Richei*), Coastal Tea-tree (*Leptospermum lævigatum*), Clustered Everlasting (*Helichrysum semi-papposum*) and other species of the last-named genus were collected. The scarcity of bird and animal life during our stay was very noticeable; an occasional Magpie (*Gymnorhina tibicen*), some Kookaburras (*Dacelo gigas*), and a few Parrots—mostly Rosellas (*Platycerus eximius*) and Red Lories (*Platycerus elegans*)—comprised the principal representatives of the feathered world. Blue Wrens (*Malurus cyaneus*), both male and female, were also in evidence, a number of these dainty little creatures frequenting the garden and picking up the odd crumbs thrown out for them.

No native mammals were seen, although Wallabies and Koalas are said to be found in the inland forest; but rabbits are present in such numbers that the settlers are forced to use wire-netting in order to protect their paddocks and cultivated fields from the depredations of these pests.

The Orchids of Victoria

BY EDWARD E. PESCOTT, F.L.S., F.R.H.S.

Part I.

DISTRIBUTION.

In the distribution of Australian Orchids, the State of Victoria may be considered to be well favored by nature. Possessing, as it does, a purely temperate climate, with a good rainfall, it is naturally a country where terrestrial orchids may occur in abundance.

Dr. R. S. Rogers has estimated that an annual ten-inch rainfall is necessary for proper growth and development of orchids. As there is practically no area in Victoria where the rainfall is so low, we may expect to find these plants in every district.

While Victoria is the second smallest State in the Commonwealth, it occupies third place of pride in the number of species of orchids, there being 137 recorded for the State. Queensland and New South Wales enjoy tropical conditions, as well as temperate, and so their numbers are greater, 209 and 177 species respectively. Western Australia follows Victoria, with 118; South Australia has 98; Tasmania, 82, and Northern Territory 22 species.

Many of these species, however, occur in more than one State, so that the study of orchids of one State would necessarily include those of other States. About 450 species have been recorded for Australia.

In Australia, the orchid family is represented by 64 genera, of which nine or ten are purely endemic. Victoria has recorded 25 genera, six of these being purely Australian types, namely *Diuris*, *Spiculoea*, *Eriochilus*, *Burnettia*, *Leptoceras*, and *Glossodia*.

Complete surveys of orchids have not yet been made in Victoria. While the orchid flora of the mountains, centre, north-east and south-east is fairly well recorded, very little exploration work has been carried out in the Mallee, and in the extreme western areas. Naturally, far more is known of the orchids within 50 miles of Melbourne, than elsewhere.

LITERATURE.

Fitzgerald's *Australian Orchids*, a large and costly work, is the classic of Australian Orchideae, and it may be consulted at our Public Library. The life-size coloured drawings and diagnoses are very clear and good.

The following articles on Orchids have appeared in the *Victorian Naturalist*:—

(1) *The Orchideae of Victoria.*—A series of articles by Charles French, Senr., in the following numbers:—1884, Vol. I., Nos. 1, 3, 6, 7, 11, 12; 1885, Vol. II., Nos. 4, 11; 1886, Vol. III., Nos. 5, 6; 1887, Vol. IV., Nos. 1, 4.

(2) *Observations on the Flowering Times and Habitats of Some Victorian Orchids,* by Charles French, Jr., July, 1895, Vol. XII.

(3) *List of Orchids Collected Near Sale,* by May and Lilian Wise, and Muriel Bennett, July, 1895, Vol. XII.

(4) *Additional Localities for Victorian Orchids,* by T. S. Hart, M.A., Aug., 1895, Vol. XII.

(5) *A Westralian Form of the Orchid Prasophyllum Australe,* by Oswald H. Sargent, September, 1913, Vol. XXX.

(6) *A Year Among the Orchids: a Reminiscence,* by E. E. Pescott and C. French, Jr., September, 1916, Vol. XXXII.

(7) *Notes on the Reproduction of Terrestrial Orchids,* by E. E. Pescott, February and March, 1918, Vol. XXXIV.

(8) *Notes on the Orchids of Victoria,* Part I., by E. E. Pescott, January, 1921, Vol. XXXVII.

(9) *On Four Orchids, New for Victoria,* by E. E. Pescott and C. French, Jr., January, 1921, Vol. XXXVII., Pl.

(10) *The Blotched Sun Orchid,* by E. E. Pescott, January, 1921, Vol. XXXVII.

(11) *Notes on the Orchids of Victoria,* Part II., by E. E. Pescott, January, 1924, Vol. XL., Pl.

(12) *Thirty Years Orchid Collecting,* by E. E. Pescott and C. French, Jr., April, 1925, Vol. XLI., Pl.

(13) *Two Autumn Greenhoods,* by E. E. Pescott, July, 1925, Vol. XLII., Pl.

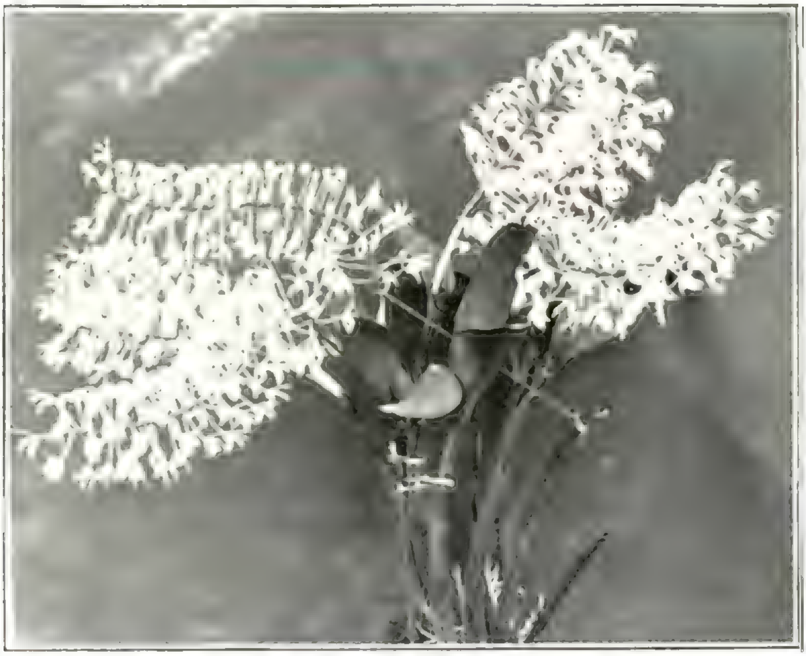
(14) *The "Rufa" Group of Greenhoods,* by A. J. Tadgell, October, 1925, Vol. XLII., Pl.

(15) *The Propagation of Our Pterostylis,* by W. H. Nicholls, December, 1925, Vol. XLII., Pl.

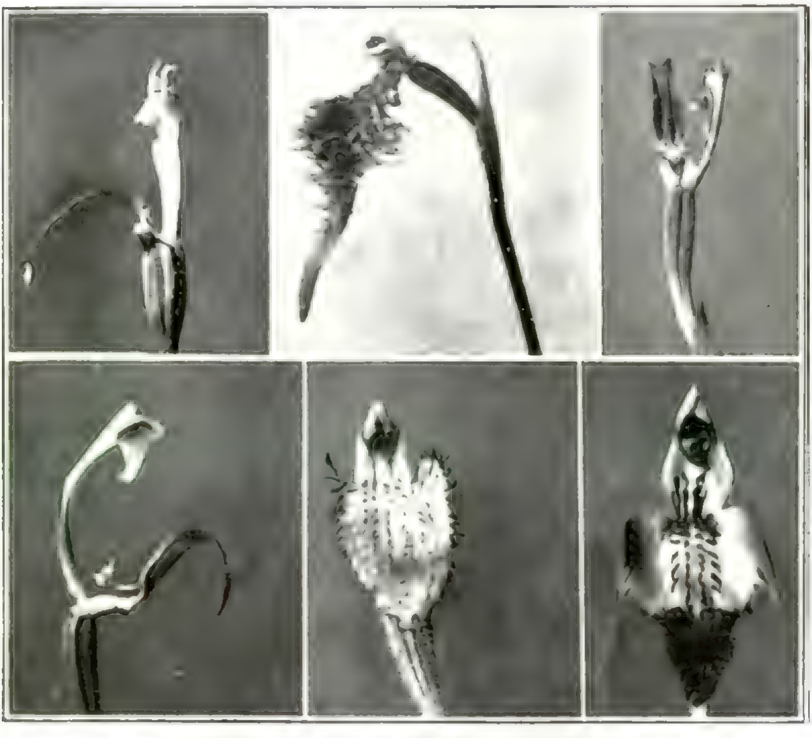
(16) *Notes on the Genus Corysanthes,* by Rev. H. M. R. Rupp, May, 1926, Vol. XLIII.

(17) *The Greenhood Orchids of Victoria,* by W. H. Nicholls, July and August, 1926, Vol. XLIII., Pl. (2).

Plate IV.



DENDROBIUM SPECIOSUM, Small Rock Orchid.



LABELLA OF VARIOUS ORCHIDS.
(see page 144 for detailed description.)

Records of new species recorded in the *Naturalist*, are as follow:—

Pterostylis Mackibbini—F. v. Mueller, October, 1892.
Prasophyllum Dixoni—F. v. Mueller, June, July, 1892.
Prasophyllum Frenchi—F. v. Mueller June, July, 1892.
Drakaea Huntiana—F. v. Mueller, April, 1899.
Prasophyllum fusco-viride—F. M. Reader, February, 1898.
Diuris punctata, var. *D'Altoni*—C. Walter, March, 1907.

WHAT IS AN ORCHID?

Briefly, there are two features present in the flower which differentiate an orchid from every other flower. The first is the labellum, or lip. An orchid flower has six perianth segments, or divisions, three sepals, two petals, and the labellum. That is, in the orchid flower, one petal has developed differently from the other two, the development being usually remarkable. In orchids the labellum is variously like a pouch, a claw, a mass of hairs—it is often grotesque and frequently very beautiful.

In many orchids, the labellum is the conspicuous and beautiful part of the flower.

The second feature is known as the column. This organ usually stands in the centre of the flower, forming a combination, or a union of the stamens, style and stigma into one organ. The column can clearly be seen in any orchid, and in the illustrations given.

In one genus of orchids, *Thelymitra*, the unusual appearance of the lip is not present, the flower appearing almost regular, except that the lowest "petal," which is really the labellum, is often somewhat larger and more vigorous in form than the other two.

GROUPS.

According to their habit of growth and their methods of obtaining sustenance, orchids are classed into two groups. The first group includes those that grow upon trees, the *Epiphytes*. They are not parasites. This class of plant, in growing upon trees, also derives nourishment from the sap of the trees. But the epiphytes merely cling to and grow upon the trees, using them as a means of support, obtaining nourishment and moisture from the air and from rain. There are four epiphytes, and possibly five, recorded among Victorian orchids.

The second group is classed as *Terrestrial*, and includes by far the greater number of local species, 133 in all.

REPRODUCTION.

The production of seed in orchids is very considerable. Many thousands are contained in one seed-vessel. There must thus be a vast loss of energy, for few seedlings have ever been observed. Epiphytes, not having tubers, must of necessity increase by seed. Very few of the seeds produced ever grow, for these plants, in Victoria at least, have always been rare. To grow, the seeds would require to find lodgment on the bark of trees, or in rock crevices. Many would be lost by wind and water dispersal.

That seedlings of terrestrial orchids have been found is well known. The excellent article by W. H. Nichols (15) illustrates this: and there is no doubt that, where single specimens are found, they must necessarily have their origin from seed.

Where plants are found in clusters or colonies, their reproduction is certainly the result of increase by tubers. This has been fully demonstrated in a paper in the *Victorian Naturalist* (7). But little is known in regard to either aspect of the question, and here is a wide field worthy of serious investigation.

CLASSIFICATION.

ORCHIDACEAE.

TRIBE 1.—MALAXIDEAE:—Another lid-like incumbent, usually deciduous. Pollen masses waxy, two, four or rarely eight, without caudicles or glands. Epiphytes, or rarely terrestrial, with a creeping rhizome.

1. DENDROBIUM, Sw.

Anther cells longitudinal. Lateral sepals dilated at the base, forming, with the basal projection of the column, a pouch or *spur*. Pollen masses two, or four, in pairs. Labellum, with a broad erect base, usually expanded into lateral lobes. Stems or pseudo bulbs, bearing both leaves and peduncles.

In Australia the genus *Dendrobium* (having life, or living, on trees) finds its highest expression in Queensland, where 44 species are recorded. It is thus a tropical genus. Two species are recorded for Victoria, one extending to Tasmania.

1. DENDROBIUM SPECIOSUM (showy) Smith, Rock Orchid. Leaves from ovate to elongate-elliptical, on long stems or pseudo-bulbs, terminally crowded, rigid; racemes often above one foot in length, somewhat curved downward; flowers fairly large, numerous, 50-100 in raceme, cream-coloured, or pale yellow; sepals and petals nearly equal, usually incurved, three-quarter to one inch in length, lanceolate, the lateral ones forming, with the basal projection of the column, a short broad pouch. Labellum shorter than the petals, *nearly white, spotted with purple*, lateral lobes short and broad, the middle lobe broader than long. Column white, *often spotted with purple*.

Found chiefly on rock-faces in extreme east of State, near Cape Howe and Genoa River; also in N.S.W. and Queensland; flowers in spring. The strong, striated "stems," are called "pseudo-bulbs," and contain the stored nutriment necessary during the flowering period. They are often over a foot in length.

This is one of the best known of epiphytal orchids, and is usually sold and grown under the name of "Rock Lily." It is somewhat difficult to flower in cooler climates; but if watered well in summer, and kept almost dry from Easter, the flower spikes will often develop quite freely. In the tropics, more rain falls in summer than in winter, hence the reason for this treatment.

The Rock Orchid has very few pests, but Mr. Charles Barrett records that Rock Wallabies feed on the plants in Eastern Gippsland, wherever they find opportunity.

The Queensland variety, *Hillii*, has large, cream-coloured flowers. A pink form has been collected in New South Wales.

2. D. STRIOLATUM (streaked), Reich., Streaked Rock Orchid. Usually a rock-plant; generally dwarf, stems from ample creeping rhizomes; thin branched; *leaves narrow cylindrical*, one to four inches in length. *Peduncles one-flowered, rarely two*, on pedicels half-inch in length. Sepals and petals white or whitish-yellow, with three to five red-coloured streaks (striae) towards the base, about three-quarter inch in length; the short basal spur being present as in former species. Labellum rather shorter than the sepals, dilated in the middle into two broad lobes, the middle lobe recurved, the margins crisply undulate, the disc with three undulate raised lines or plates.

Found chiefly on rocks, rarely on trees, from Bairnsdale to far Eastern Gippsland. The short, roundly cylindrical leaves are numerous; the flowers are not abundant on the stems. This plant is quite a contrast to the "Rock Lily." The small, cylindrical leaves are quite unlike those of the former species, and very few flowers are ever present. This species occurs also in New South Wales, and on the east and north coasts of Tasmania. Figure 112 in Mueller's "Key."

TRIBE 2. VANDAE.—Anther lid-like, incumbent, usually deciduous. Pollen masses waxy, four, in pairs, on a single or double caudicle attached to a gland. Epiphytes or Terrestrials, with creeping rhizomes, or tuberous roots.

2. DIPODIUM, R.Br.

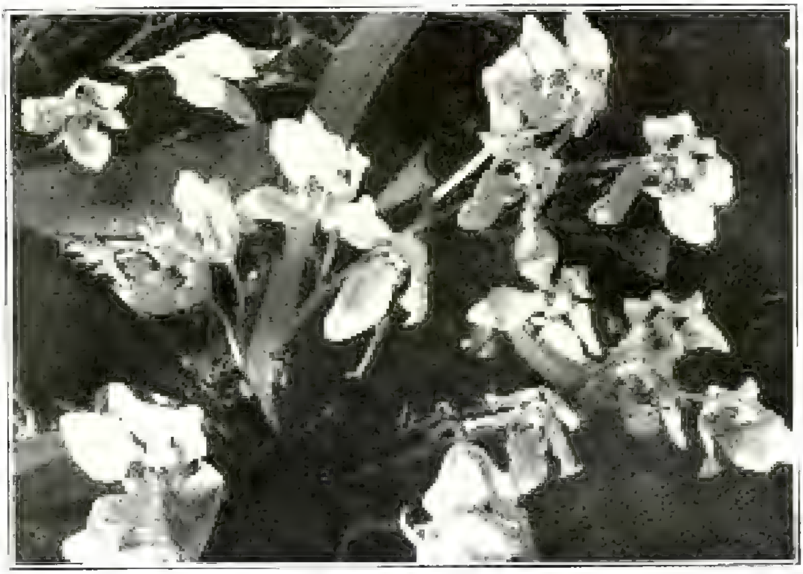
Terrestrial, with short, creeping, stout tuberous roots. Perianth segments free, nearly equal, spreading. Labellum sessile, erect, three lobed, lateral lobes shorter than the central one. Column erect, semi-cylindrical. Pollen masses two, waxy. Terrestrial, glabrous herbs, with imbricated (overlapping) sheaths at base of flowering stem, the upper ones becoming distant and bract like. *Flowers spotted.*

The genus *Dipodium* extends to Australasian islands, there being two species in Australia. The single Victorian species is leafless and presumably symbiotic; it lives in association with a fungus, which stimulates the root system into action and vigour. The name *Dipodium* (dis, double; podion, a little foot) has reference to the two stalks, or false caudicles of the pollinary apparatus.

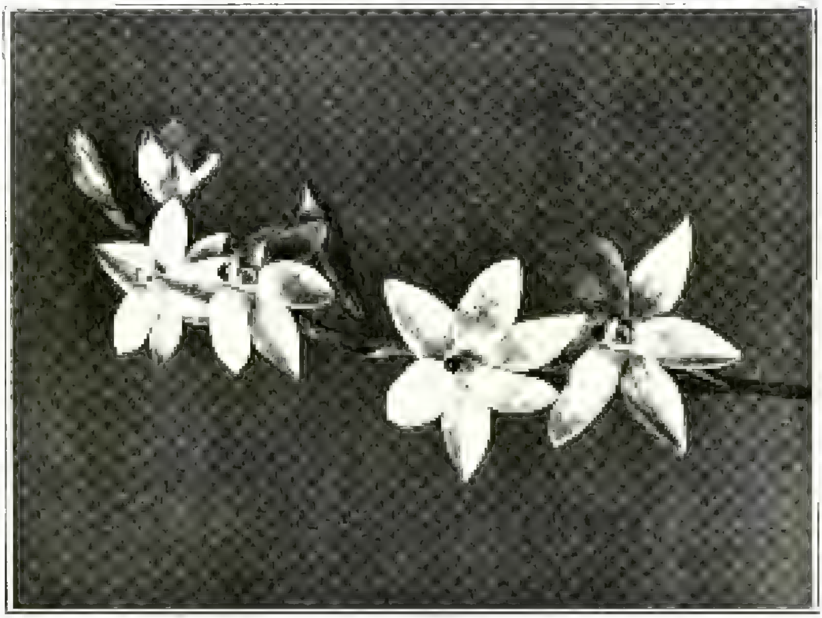
1. DIPODIUM PUNCTATUM (spotted), R.Br., Hyacinth Orchid.—A fleshy, leafless, brown, stemmed plant, growing up to three feet in height, with an extensive system of thick brittle tuberous roots. Flowers numerous, *deep pink,* rarely white or yellow, spotted, in a loose raceme. Perianth segments (petals and sepals) free, similar, recurved or spreading, sepals about half-inch in length, petals shorter. Labellum sessile (without a stalk), erect, three lobed, the middle lobe longer than the lateral ones; lamina with two short, raised lines below the centre, uniting to form a hairy keel, ending in a woolly patch near the apex. Column about half as long as labellum. Anther hemispherical, lid-like, two-celled. Pollinia waxy bilobed.

Found commonly all over the State, especially in more open ground, and frequently after bush fires. The tall

Plate V.



SARCOCHILUS PARVIFLORUS. *Small Sarcochilus*, Lindl.



THELYMITRA IXIOIDES, Sw. (*Dotted Sun Orchid*) stems, with rich pink flowers, are conspicuous in December and January, and specimens have even been collected in May. The species disappears rapidly as population extends.

This is quite a conspicuous flower in the bush, and is much sought after about Christmas time. The tubers do not send up flowers every year, and all attempts to cultivate the species have failed. The thick, fleshy tubers are rather extensive in the soil, and are very brittle. Frequently, after bush fires, this orchid reappears in considerable numbers. Miss J. Galbraith records that, after the 1923 bush fires, near the Tyers River, *Dipodium punctatum* was unusually common, and its spikes of bloom were large and deeply coloured. This abundant occurrence was repeated twelve months later.

A white form has been recorded from the Grampians; while near Mudgee, in New South Wales, Mr. A. G. Hamilton found a greenish-yellow variety, with purplish spots.

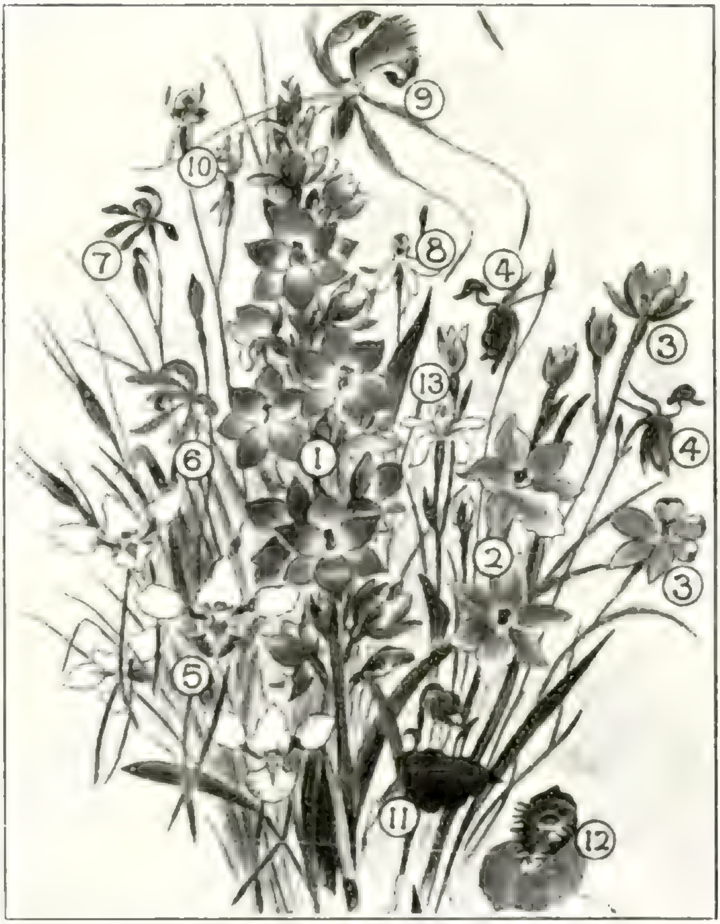
3. SARCOCHILUS, R.Br.

Epiphytes; caudicle single; sepals and petals free. Labellum with a fleshy protuberance underneath, between the lateral lobes. Pollen masses four, connate into two, waxy. *Basal spur absent.*

This genus also is more tropical, although two species travel down into Victoria, one extending to Tasmania. The name, meaning "fleshy lip," is very suitable, although many orchids have a fleshy labellum. In some species, the labellum is like an inverted saddle.

1. **SARCOCHILUS FALCATUS** (sickle-shaped, referring to the leaves), R.Br., Snowy Sarcochilus.—Epiphytal; leaves almost oblong, usually falcate, two to four inches in length, and quarter to half inch in width. Peduncles (flower-stalk) scarcely exceeding the leaves. Flowers three to five, distant, *white.* Sepals and petals nearly equal, obtuse, half-inch long; the lateral sepals adnate to the base of the basal projection of the column. Lateral lobes of labellum large, ovate, the middle lobe short and broad, with a thick fleshy protuberance. Column short, with two prominent angles.

Found on trees near the Cann River, in East Gippsland; also in N.S.W. and Queensland. The white flowers, coming in spring, are very dainty and beautiful. In general appearance this species is somewhat like another New South Wales orchid, *S. Fitzgeraldi,* except that the



Key to Colour Plate opposite.

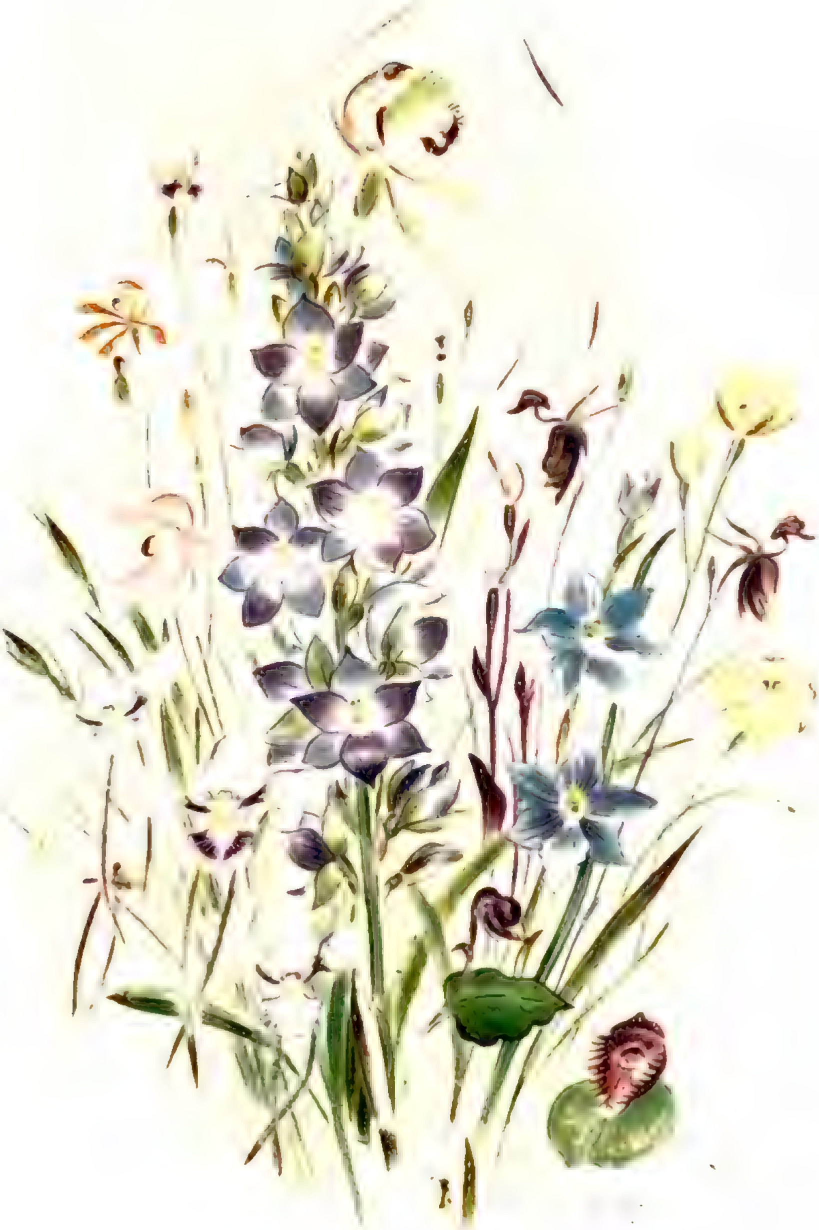
1—*Thelymitra grandiflora*, Fitz. 2—*Thelymitra venosa*, R.Br. 3—*Thelymitra antennifera*, Hk.f. 4—*Caleana major*, R.Br. 5—*Diuris alba*, R.Br. 6—*Caladenia congesta*, R.Br. 7—*Caladenia iridescens*, Rogers. 8—*Caladenia praecox*, W. H. Nicholls. 9—*Caladenia dilatata*, R.Br. 10—*Leptoceras fimbriatum*, Lindl. 11—*Corybas unguiculata*, R.Br. 12—*Corybas fimbriata*, R.Br.

(The Club is indebted to Mr. W. H. Nicholls for painting the original of this plate.)

Detailed description of illustrations (labella) on Plate IV.

Top:—1—*Pterostylis barbata*, Lindl. 2—*Calochilus campestris*, R.Br. 3—*Pterostylis concinna*, R.Br. Lower:—4—*Pterostylis nutans*, R.Br. 5—*Caladenia Patersoni*, R.Br. 6—*Caladenia dilatata*, R.Br.

Plate VI



W. H. Nicholls, del.

SOME VICTORIAN ORCHIDS.

latter has the flowers spotted with crimson-lake markings.

2. SARCOCHILUS PARVIFLORUS (small-flowered), Lindley, Small Sarcochilus.

Epiphytal; recorded occurring on Blackwood, Hazel, Musk, Pittosporum, Eriostemon, Eucalypt, Sassafras and Blanket Leaf. Leaves thin, narrow oblong, somewhat falcate. Flower stems longer than the leaves; flowers up to six, calyx lobes and lateral petals greenish, lower petal white, lateral lobes conspicuous, spotted with red. Labellum nearly sessile, white, tinted with yellow, spotted or streaked with red.

Growing on trees, usually in moist gullies or adjacent to watercourses, from the Dandenong Ranges to the extreme east. The long, thin, pendant roots often are a foot or more in length. In humid weather the flowers are fragrant. The flowering season extends from September to December, according to the situation. This species usually occurs high up on the branches of the trees, so that it would thus escape general notice. It is often first discovered by the presence of the long, pendant, thread-like roots.

Owing to the infrequent germination of the seeds, this species reproduces very slowly. Colonies are not abundant; and one would here enter a plea for its preservation wherever seen, it is not readily established under cultivation, and care is needed to grow it successfully.

In secluded valleys in East Gippsland, I have seen boughs of the Blunt-leaf Wax Flower, *Eriostemon trachyphyllus*, F. v. M., literally covered with this lovely orchid.

There is a record that Baron von Mueller collected *S. parviflorus* at Apollo Bay, but it has not been seen in that district for many years. It is found also in New South Wales and Tasmania.

Contributions for the "Field and Study" pages of the *Naturalist* are needed, and country members especially are invited to forward notes. Cuttings from newspapers and other journals are not desired; but original observations, however briefly recorded, will be welcomed. Such contributions should be addressed to the Editor.

VICTORIAN FERNS

BY H. B. WILLIAMSON, F.L.S.

Part IX.

Genus ATHYRIUM.

ATHYRIUM UMBROSUM, Ait. Shade Spleenwort. Fig. I. T.; V.; N.S.W.; Q.; As.; Af.; Poly.; N.Z. This fern was included by Bentham under genus *Asplenium*, section *Athyrium*. It differs from *Asplenium* in having sori small, curved, mostly at the forks of the veins proceeding from the midrib. It is a shade-lover, frequenting alluvial soil in dark, shady forest country, and, although growing from three feet to five feet in height, it cannot be described as a robust fern, its fronds being very tender, and often drooping at the tips. The fronds are twice or thrice pinnate, secondary pinnules being about an inch in length, and often deeply toothed. Veins oblique, usually forked. Sori small, oblong, usually on the veins below the fork, or partly on one fork and then somewhat curved. Indusium similar to that of *Asplenium*.

Localities:—Dandenong and Otway ranges, and Gippsland. In the dark, jungle-like creek alluvial (e.g., Cann River, H.B.W.).

Genus POLYSTICHUM.

This was a section of *Aspidium*, but is now kept apart, and is distinguished by its peculiar circular, peltate indusium, like a mushroom, from under the rim of which the sporangia protrude.

POLYSTICHUM ACULEATUM (L.), Schott. Common Shield Fern. Fig. II. All parts of Australia exc W.A. and N.A. All continents and Polynesia and N.Z. This is one of our most common species, sometimes known as "Cathead Fern," lining the upper watercourses in great profusion, generally associated with *Blechnum discolor*, and with it, persisting long after its natural shelter has been destroyed. Fronds rise one foot to two feet; they are twice pinnate, with the lower part of the stalk, and the whole frond when young, very shaggy, with dark brown chaffy scales, mixed with hair-like ones. Secondary pinnules about half-inch in length, prickly toothed, with a prominent angle or lobe on the upper or inner side. Sori usually six to eight on each pinnule, with a peltate indusium seen as a circular cover in a young state, but shrivelled up and shapeless when advanced. Like *Asplenium bulbiferum* it may be propagated from the bulb-like swellings sometimes attached to the rachis of the pinnae.

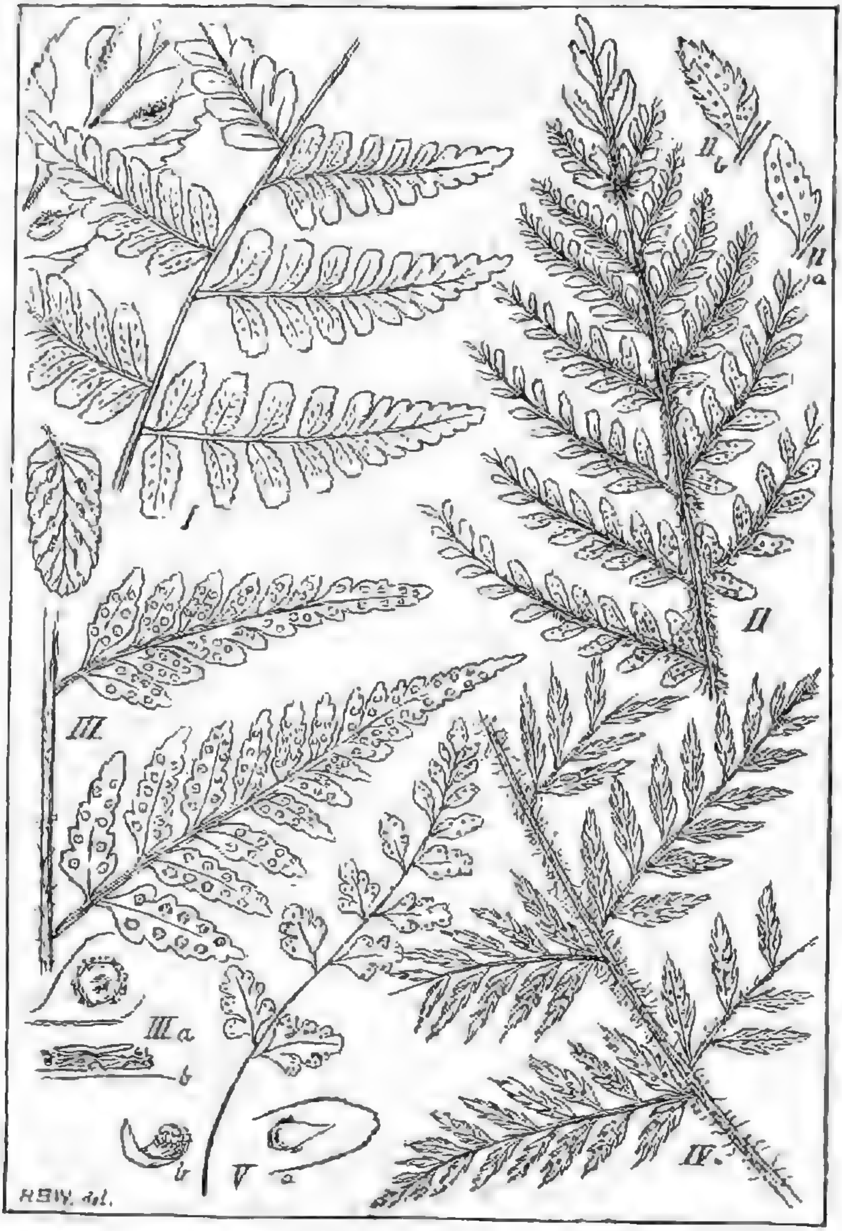
There is a closely allied species in New South Wales, *P. aristatum*, Presl., which, in the bristle-like teeth of the pinnules much resembles the prickly-toothed form of *P. aculeatum*, Fig. IIb., but is distinguished by having light green and glossy fronds with the stipes scaly at the base, not shaggy hairy, and with few hairs on the fronds. It may yet be found in Victoria.

POLYSTICHUM ADIANTIFORME (Forst.), J.Sm. (*Aspidium capense*, Willd). Leathery Shield Fern. Fig. III. T.; V.; N.S.W.; As.; Af.; Am.; N.Z. Fronds six inches to two feet from a rhizome, often creeping on tree trunks, usually broad, rigid, pale, with scaly hairs on the rachis, mostly pinnate, but the smaller ones occasionally simply pinnate. Pinnules leathery, toothed or pinnatifid; veins concealed, but midrib prominent above. Sori round, large, one to each tooth or lobe. Indusium peltate and rigid, but much shrivelled on old sori. Common in the Otway and Dandenong Ranges, in Gippsland, and N.E. Ranges. IIIa., enlarged view of indusium; IIIb., sectional view of same.

POLYSTICHUM HISPIDUM (Sw.), Smith. (*Asp. hispidum*, Sw.). Hairy Shield Fern. Fig. IV. T.; V.; N.S.W.; N.Z. Fronds one to two feet from a thick rhizome, triangular in outline, usually thrice pinnate, with pinnules deeply divided into sharp-pointed lobes, each with a solitary vein. Frond stalk and primary rachis beset with long, fine, spreading, dark-coloured hairs. Sori solitary on the smaller segments or lobes. Indusium circular, attached by an almost central stalk. Dandenong and Otway Ranges (Johanna River near Crowes, H.B.W.).

Genus CYSTOPTERIS.

CYSTOPTERIS FRAGILIS (L.), Bernh. Brittle Bladder Fern. Fig. V. Vic.; Tas.; all continents and Poly. and N.Z. A delicate fern, with fronds six inches to nine inches in length, and two inches to three inches in width. Segments ovate or lanceolate, pinnatifid or dentate, with obtuse lobes or teeth. Sori several on each segment, at first enclosed in a tender, bladder-like indusium which folds upward over the sori, and which soon disappears under the enlarged globular sori, so that it may be mistaken for a large form of *Anogramma leptophylla*.



I., ATHYRIUM. II., III., IV., POLYSTICHUM. V., CYSTOPTERIS.

This species has been rarely gathered in Victoria. Baron von Mueller recorded it from the North-East—sent to him from the "Upper Murray"—with no definite locality. Mr. A. J. Tadgell's discovery on Mt. Bogong in 1923, settled the question whether it was really a Victorian fern. Va., an enlarged view of a young sorus. Vb., sorus with indusium turned back.

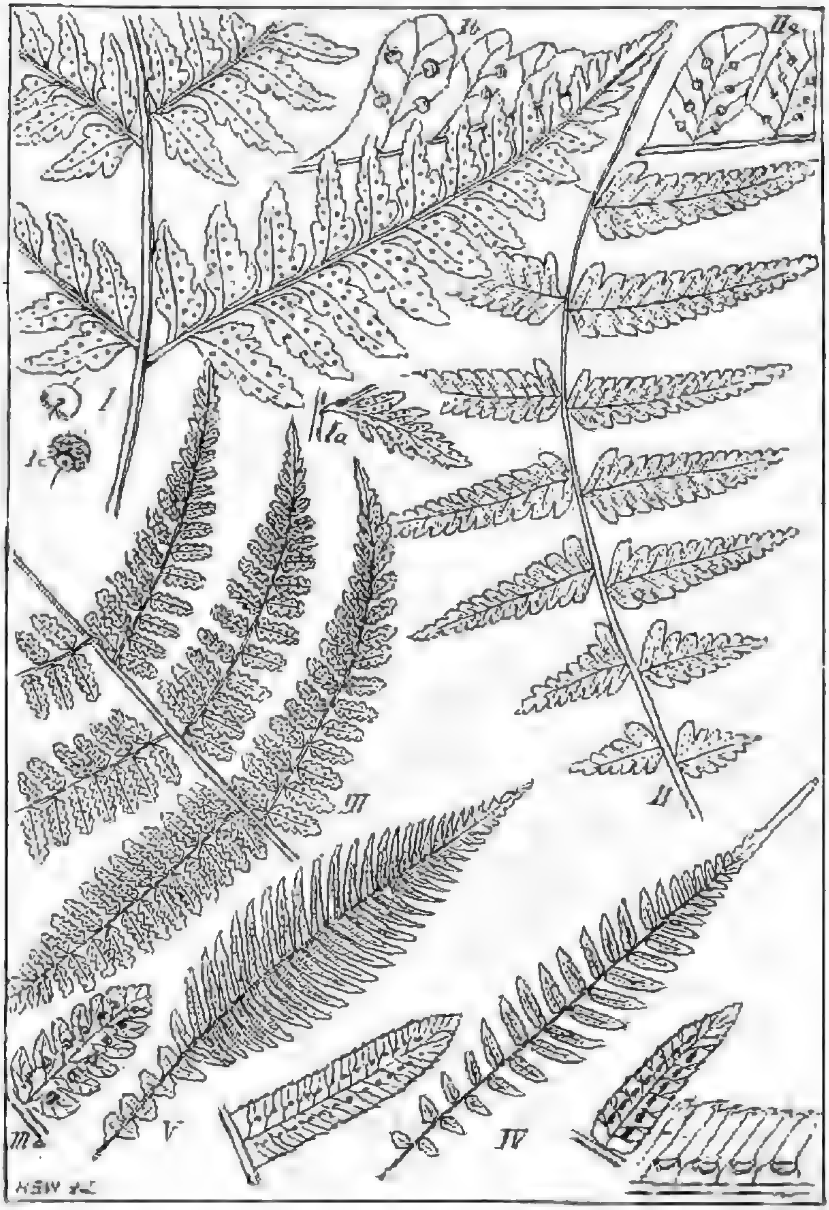
Genus DRYOPTERIS.

This genus was by Bentham included under *Aspidium*. It differs from *Polystichum* in having the indusium reniform and attached by a stalk in the sinus on one side.

DRYOPTERIS DECOMPOSITA (R.Br.), Ktze. Shiny Shield Fern. Fig. I. All parts of Australia except W.A. and N.A., also in Polynesia and N.Z. A common fern, with fronds glabrous, or the stalks and primary nerves short-hairy, very variable in size and outline; from six inches to two feet, usually twice pinnate, with secondary pinnae pinnately toothed or lobed, the teeth acute, and the margins of the lobes usually nerve-like. Veins distinct, often showing on the upper surface by reflected light. Sori one or two on each principal lobe, not far from the margin. Indusium circular, reniform, often concealed as the sorus enlarges. Fig. Ic. shows early and late stages of the indusium. It grows in all parts of Victoria, except the N.W.

DRYOPTERIS PARASITICA (L.), Ktze. (*Asp. molle*, Sw.). Fig. II. All parts of Australia, except W.A. and Tas., also As.; Af.; Poly.; N.Z. Fronds one foot to two feet, from a short thick rhizome, usually light green, short-hairy and simply pinnate, three to five inches in length, truncated at the base, regularly pinnatifid, mostly sessile, lower ones gradually smaller and more distant, the lobes of the pinnae sometimes short, sometimes reaching above halfway to the midrib. Veins pinnate on each lobe, branches of adjoining lobes united in a vein tending to the sinus. Sori in a row about half-way between the midrib and the margin. Indusium circular, reniform, soon disappearing.

This is one of the most favoured ferns for cultivation. It has rarely, if ever, been gathered in Victoria. Its record for the N.W. of the State seems to be based on the specimens collected on "Murray cliffs," Woolls (a collector in N.S.W.), and those gathered on "Cliffs on the Murray, Blanchetown," S.A. The S.W. record is from specimens sent to Mueller by Mr. Callaway, from Curdie River, where it *may* have been collected in a wild state.



I., II., DRYOPTERIS. III., HYPOLEPIS. IV., V., DOODIA.

Genus HYPOLEPIS.

HYPOLEPIS RUGOSULA (Labill.), Smith, Syn. *Dryopteris punctata* (Thunb.), C. Chr., *Polypodium punctatum*, Thunb., *Phegopteris rugulosum*, Labill, and many others. Ground Hypolepis. Fig. III. All States except W.A. and N.A., also As.; Af.; N.Z. Fronds rising one foot to four feet, from a widely creeping rhizome, twice or thrice pinnate, their ultimate segments being half to one and a-half inches long, deeply dentate. Sori circular in two rows on the smaller pinnules or lobes, with no indusium, or with sometimes incurved edges of the pinnules suggesting a covering as in *H. tenuifolia*, from which it may be known by its more copious sori. It is also a smaller and coarser fern, and more common, being found in all parts of Victoria except the North West.

Hooker says in his "Species Filicum," under *Phegopteris punctatum*, Thunb. (*P. rugulosum*, Labill): "Perhaps no fern has been so generally misunderstood both in regard to genus and to the limits of the species, and this is partly owing to its being very variable, both in size and feature, and to the close proximity of the sori to the margin of the pinnules, and the frequent inflection of the lobes of those pinnules which give the appearance of an involucre of a *Cheilanthes* or a *Hypolepis*."

In the Trans. N.Z. Institute of July, 1926, H. Carse quotes from recent letters from Dr. Christensen, of Copenhagen, the author of "Index Filicum," regarding *Dryopteris punctata*, C. Chr.: "It is a true *Hypolepis*, not at all a *Dryopteris*, as listed in my Index. In the Supplement it is placed under *Hypolepis*."

In the same letter Christensen calls attention to the wrong spelling (*rugulosum*) of the species name of Labillardiere's plant, and to the difference of vestiture of *Hypolepis* and *Dryopteris*, a difference that cannot be made out by the unaided eye. A better vernacular name may yet be found for such a common fern.

Genus DOODIA.

This genus is distinguished by having oblong, linear sori arranged in one or two rows parallel to the midrib of the pinnae, and provided with a cover opening inwards.

DOODIA CAUDATA (Cav.), R.Br. Small Rasp Fern. Fig. IV. All States except W.A. and S.A., also Poly. and N.Z. The fronds rise to about a foot in height, from a tufted rhizome, and are simply pinnate, the pinnae being from one inch to two inches in length, scabrous and very variable in size. Lower pinnae are distinct, often broadly auricular at the base, attached by the midrib only, and mostly barren. Intermediate ones are falcate, with a broad base, mostly fertile, and attached by the midrib only, the upper ones more adnate, the uppermost short and confluent into a lanceolate apex to the frond, which sometimes takes up half the length of the whole frond. Small, delicate forms have been found four or five inches long, and less than an inch wide with very narrow, distant pinnae. All parts of the State except the N.W.

DOODIA ASPERA, R.Br. Rasp Fern. Fig. V. Vic.; N.S.W.; Q. only. This can easily be distinguished from *D. caudata* by its having all its pinnae attached to the midrib by a broad base. It is a broader and more scabrous fern; its pinnae are rigidly serrate, the lowest being reduced to small, wing-like appendages to the rachis. The sori are almost globular, instead of being oblong as in *D. caudata*.

This species is not nearly so widely spread as D. *caudata*, and some confusion has occurred in its determination. The record "all" in the Census is wrong, for many specimens of *D. caudata* have been labelled in error "*D. aspera.*" The only specimens I have seen from Victorian localities are from Cape Howe (C. Walter), Orbost (E. E. Pescott), and Drouin (C. French).

The ferns named below were listed in the 3rd Supplement to the "Census of the Victorian Ferns" (*Vic. Nat.*, September, 1925), as Victorian species, but, in my opinion, this was a mistake, and was due, in the case of some species, to errors in determination, and in others to insufficient evidence as to the locality from which the specimens were obtained:—

Alsophila Cooperi, F. v. M.; *A. Rebeccae*, F. v. M.; *Dryopteris queenslandica*, Domin.; *D. tropica*, Domin.; *D. glabella*, C.Chr.; *Asplenium adiantoides*, C.Chr.; *Polystichum aristatum*, Presl.; *Blechnum serrulatum*, Richards; *B. laevigatum*, Cav.; *Cyclophorus rupestris*, C.Chr.

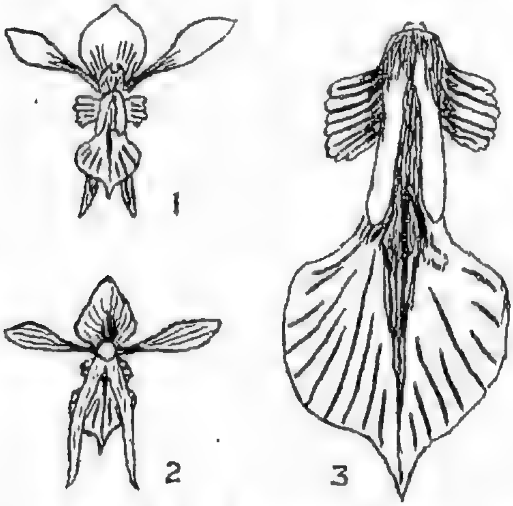
In concluding this series of articles, I desire gratefully to acknowledge the help I have received from Messrs. Audas and Morris, of the National Herbarium, where, through the courtesy of the Government Botanist, Mr. F. Rae, I am privileged to make searches among the numerous specimens and the many valuable books in that institution. The valuable series of papers on Victorian Ferns by Mr. C. French, Senior, in the *Southern Science Record*, 1881, and the popular article by Mr. F. Pitcher (*Victorian Naturalist*, May, 1913) have also been of much assistance to me.

A NEW SPECIES OF *DIURIS*.

By the Rev. H. M. R. Rupp, Paterson, N.S.W.

In January of the present year, Mr. C. Barrett visited the Barrington Tops Plateau, at the head of the Hunter and Paterson River valleys, N.S.W., and on his return he kindly brought me specimens of several interesting terrestrial orchids. Among them was a *Diuris*, of which I had previously received imperfect material, and which I believed to be an undescribed species.

Through the courtesy of Professor Harrison, of Sydney University, and of Mr. E. Cheel, Curator of the National Herbarium, Sydney, I was able to inspect dried specimens of the same orchid, and to compare them with those brought by Mr. Barrett. Dr. R. S. Rogers and Mr. Cheel endorsed my opinion, and the Linnean Society of N.S.W. accepted, for its August meeting, a description which I prepared of this plant, under the name of *Diuris venosa.*



Diuris venosa, n.sp.

1. Flower, front view, natural size.

2. Flower, back view, natural size.

3. Labellum from above, flattened out, enlarged.

To Mr. J. L. Boorman, formerly collector for the late Mr. J. H. Maiden, belongs the credit of first bringing the orchid under the notice of the authorities. His specimens, collected in 1915, are now in the Sydney National Herbarium, where they were regarded as doubtfully conspecific with *D. spathulata*, Fitzg. The latter is a plant of the dry western plains, whereas *D. venosa* grows in boggy places, at 5,000 feet.

The mid-lobe of the labellum of *D. venosa* is spathulate, as in *D. spathulata*, but instead of the transverse ridges characteristic of the latter, it is longitudinally veined, and the lateral lobes are more prominent, crenulate on the margins, and heavily veined. The general colour of the flower is lilac, all segments except the lateral sepals being strikingly veined with reddish-purple lines. The flowers are not large, but the colouring makes this a very attractive little species of the endemic Australian genus to which it belongs.

WHERE *D. VENOSA* GROWS.

Among the foothills, heat and dust made travelling unpleasant, when, with Mr. John Hopson, I began the long ride from Eccleston to the Barrington Plateau. Before sunset we had passed from mid-summer into spring.

We rode slowly through a brush of beech trees (*Nothofagus Moorei*), across the Gloucester Tops, and at last, from a belt of Eucalypts, into open country—a wide, sunlit space of the Barrington Plateau, where a lake might have been in old time, but green now, with dark morass areas, and the narrow, gleaming ribbon of a creek woven through it—from hills to hills a mile away. The track goes where the land is firm, over level ground and green undulations. And all the way we rode in alpine gardens, millions of wild-flowers, pearled with mist or dew. The scene brought memories of Palestine in spring, though here were none of the red poppies, our flowers for remembrance: the dominant colours were yellow, pink, and blue. Pimeleas toned the splendour with white blossoms.

Close to the cattlemen's hut, sole habitation on the Tops, I found my first specimens of the new *Diuris*, growing among grasses and marsh-plants. I went ankle-deep in ooze to gather them. The flowers, lilac and rose-purple, are dainty as small butterflies; and beautiful as any terrestrial orchids known to me. *D. venosa* is chiefly a swamp-dweller, but it grows also, if sparingly, on the "downs," among Bluebells and tall Helichrysums, and pygmy plants, with sage-like flowers, the colour of lavender.

The *Diuris* seemed at first to be rare; but when I knew its preferences in location, I found it to be fairly plentiful. Here and there a lonely plant occurred; in some spots dozens were seen at a glance. I would call it the princess of its genus; and could wish that it grew in our State. How is fertilisation of this orchid effected?

By insects certainly. In each of several blossoms examined, was a small dipterous fly. In Floral Biology we have a vast field, almost untilled. Is it presumption for a "general" naturalist to suggest to botanists, that study of the relations between insects and plants, is more profitable than dealing with problems of nomenclature? Assuredly, it comes within the province of the field naturalist, and may be commended to young members, especially.—CHARLES BARRETT.

F.N.C. ORCHID SECTION.

At a meeting of the Orchid Section of the Club, held at the National Herbarium, on August 4, it was resolved that the rule applied to visitors should read as follows:—"That all members of the Victorian Field Naturalists' Club who attend the meetings of the Section and pay the subscription, shall be allowed as members." Interested persons may attend as visitors.

After examining the literature on the question, it was decided to recommend to the Plant Names Committee, that *Corybas*, Salisbury (1807), be adopted for *Corysanthes* (1810), in accordance with the rules of the Vienna Conference, 1905. Further, that *Spiranthes sinensis* (Pers) Ames, be adopted for *S. australis*, Lindl. "Austral Lady's Tresses," and *Microtis unifolia*, Reich. for *M. parviflora*, R.Br., "Slender Leek-orchid," and *M. porrifolia*, R.Br. Concerning the two latter species, Prof. Oakes Ames, A.M., F.L.S., says:—"They resemble *M. unifolia* too closely to be separated from it, or to be identified with any other allied species."

Between South Sassafras, now called Kallista and The Patch, in the Dandenong Ranges, there is a small piece of forest that has so far escaped the woodman's axe. It lies in the hollow just below the garden of Mrs. Chomley's house, "Glen Elva." Here, on Sunday afternoon, August 22nd, I was fortunate enough to hear and see a small flock of Black Cockatoos, *Calyptorhynchus funereus*. There must have been more than a dozen, flying among the Blackwoods, Silver Wattles, and Mountain Ash trees, and their wailing, mournful cries were unmistakable. Though this bird is common enough further back in the ranges, it is, I am told, an infrequent visitor to the Dandenongs. One resident told me that the coming of these funereal birds is looked upon as a sign of rain. If so, they proved bad prophets in this instance, as we had beautiful weather.—A. E. KEEP.

A NEW VICTORIAN ORCHID.

BY W. H. NICHOLLS.

(Read before the Field Naturalists' Club of Victoria, August 9th, 1926.)

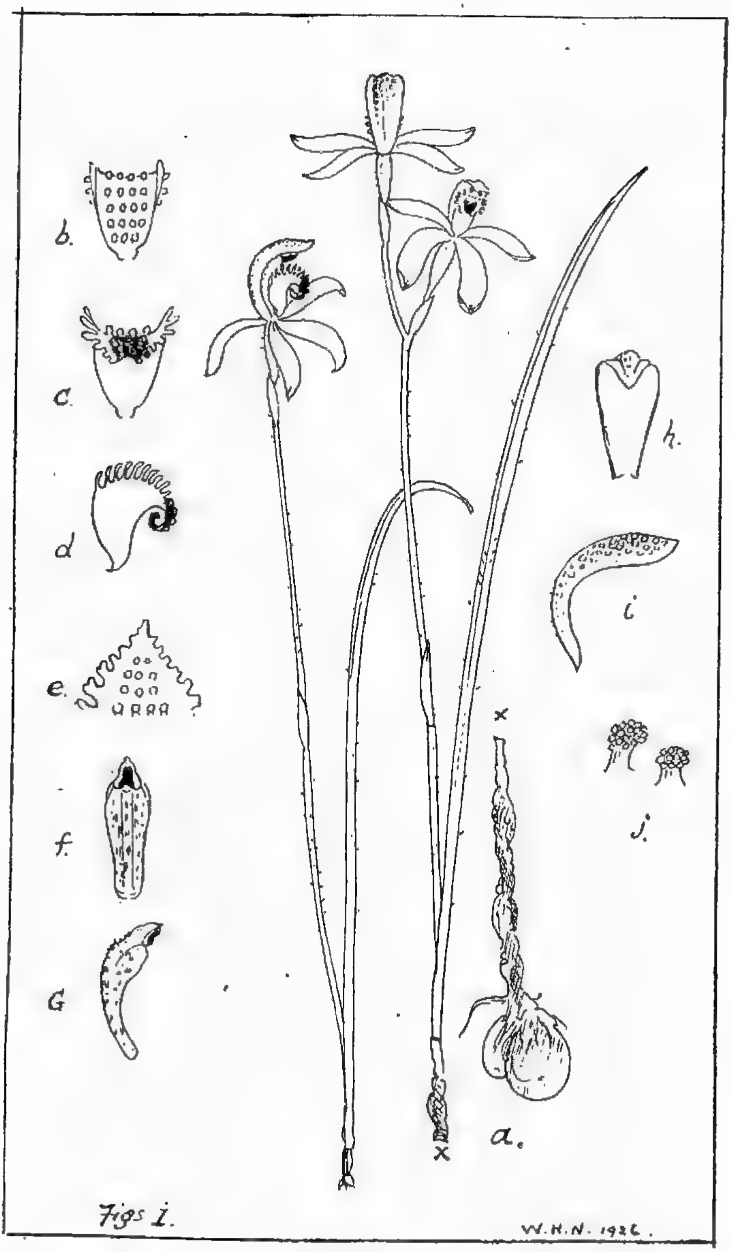
After a critical examination of the various forms of *Caladenia* occurring in the different States, more particularly those bearing white flowers, some of them differing in a morphological sense also in habit, but included under one specific name, I have concluded that our earliest-flowering white *Caladenia* is distinct and fully deserving, of specific rank. It is fairly numerous in some districts, especially around Bayswater, Ringwood, Eltham, and Whittlesea. It has been confused with the white form of *Caladenia carnea*, R.Br., *Caladenia angustata*, Fitz., and *Caladenia cucullata*, Fitz.; but it differs from all three species, in several important particulars.

CALADENIA, PRAECOX, N.SP.

Planta gracilis, circiter 15 cm. alta. Caulis erectus, prope medium, bractea parva. Folium longum, lineare hirsutum. Flores 1 vel 2, albi, pedicellis gracilibus. Sepala lateralia et sepalo dorsali, subaequalia, circiter 12 mm. longa; falcato-lanceolata vel elliptico-lanceolata, hirsuta, glandulosa; linea centrali, viridi, infra, longitudinaliter diffusa. Petala et sepala, lateralia patentia. Sepalum dorsale, erectum, incurvatum, concavum. Labellum album, apice purpurum, basi angustum, erectum, deinde recurvatum, obscure 3-lobatum. Anteriori tertia parte excepta denticulatum; loborum apices obtusi, marginibus breviter, denticulatis. Calli 4-seriati, robustiusculi, fere sessiles. Columna 6 mm. longa, gracilis, purpurea maculosa. Anthera abrupte acuta. Stigma orbiculares.

The vernacular name, White Dove Orchid, has been suggested for this species.

For specimens from the following districts, I am indebted to Mr. A. B. Braine: Bayswater, Ringwood, Greensborough, Diamond Creek, and Croydon. Flowering season: July, August, and September. (August, the best month.) Type in National Herbarium, Melbourne.



ORCHID LABELLA.

(a) *Caladenia praecox*, n.sp., typical plants. (b) *Labellum* from above. (c) *Labellum* from below. (d) *Labellum* from side. (e) Tip of *Labellum*. (f) *Column* from front. (g) *Column* from side. (h) *Dorsal sepal* from front. (i) *Dorsal sepal* from side. (j) *Calli*.

A graceful and rather slender species, about 15 cm. in height. Stem with a small acute bract, near the middle, and thickly covered with short hairs. Leaf very long, narrow-linear, sparsely hirsute. Flowers, 1 to 3, on slender pedicels, with an acute bract, about 8 mm. in length, clasping the flower pedicel. Perianth-segments, falcate-lanceolate or elliptic-lanceolate, thickly covered with reddish-brown or purplish glandular hairs and glands; except on the inner surface and at the base, where they are white. A diffused greenish longitudinal stripe down the centre of the five segments, on the under side. Lateral sepals and lateral petals, spreading, narrow at the base; the latter hardly as long as the sepals, measuring about 12 mm. Dorsal sepal, concave, incurved, its apex reaching to a point exactly in line with the apex of the decurved, recurved labellum; forming a graceful hood; but not covering the column so much as in either *Caladenia cucullata*, Fitz., or *Caladenia angustata*, Fitz. Labellum erect at base, thereafter arching and appreciably recurving at the tip, white with a purple blotch at the tip; not widely spread, hardly 3-lobed, markedly denticulated or fringed, except the forward one-third. Lobes obtuse, somewhat truncately terminating about the bend. At the tip, margins somewhat crisped or irregularly and shortly denticulated, forward half much recurved. Calli, usually short and stout, clavate, yellow tipped, in 4 somewhat regular rows reaching almost to the tip; where they are sessile, those at the base almost sessile. Column about 6 mm. in length, slender, irregularly spotted or blotched with red, very pretty. Anther, abruptly acute. Stigma, circular. Specimens with the musky odour of *Caladenia testacea*, R.Br., its nearest ally, have been collected, but they are rare. Specimens have been collected this year, with the base of the plant, also the tips and the under-surface of the five segments, plentifully marked with reddish-purple.

In some parts of Gippsland, King Parrots, *Aprosmictus scapularis*, are abundant, and many may be seen often at Beaconsfield, for instance. Lately a number of young examples was received at the Zoological Gardens. Even in immature plumage, these birds are beautiful.

CORRECTION.—*Naturalist*, August, 1926. Last line, p. 114. For "Another" read "Anther."

NOTES ON THE FLY *BOREOIDES SUBULATUS*, HARDY.

BY J. A. KERSHAW.

Although not uncommon, this extraordinary fly is not well-known, and, so far as I can find, nothing has been published regarding its habits.

The male is winged and of a brownish colour, the legs reddish, dark-brown at joints. Length, about 15 mm. The female is wingless, about 20 mm. in length, and usually of a dark-brown colour, with a dark transverse band on each of the first three or four abdominal segments. The legs are reddish, dark brown at each joint. The abdomen is much attenuated, the basal segments broad and greatly distended, the remainder tapering gradually to the apex. After the eggs have been deposited, the abdomen becomes noticeably shrivelled. The fly's movements are extremely sluggish, and when walking, the body is elevated, with the tail dragging on the ground.

The eggs are very numerous, elongate, and whitish in colour. They are laid in clusters, usually in more or less decayed wood, upon which apparently the larvae feed. The insects appear during April and May, the females often in very great numbers.

The remarkable appearance of the wingless female, with its long, slender legs, and swollen, attenuated abdomen, together with its very sluggish movements, make it somewhat repulsive, and few recognise it as a Dipterous fly.

As early as April, 1860, the first specimen, a female, was collected by the late W. Kershaw in the Melbourne Botanical Gardens, "on rushes bordering the swamp." In 1868 specimens were sent by the National Museum to the late Francis Walker, of the British Museum, for identification, and were returned labelled *Boreomyia subulata.* The species continued to be known under this name until 1920, when, finding that Walker had apparently never published a description, G. H. Hardy described and figured it under the name of *Boreoides subulatus.*

As a lad, I frequently took the females at St. Kilda, Caulfield, and Brighton, occasionally on trunks of trees, but more often on old post-and-rail fences, where they would be found with the extremity of the abdomen inserted in crevices and holes in the wood, in the act of depositing their eggs. The male was not known until many years later.

My attention was particularly drawn to this insect in May, 1919, by Mrs. M. E. Pigott, of Murrumbeena, who, with her sister, was greatly concerned by the appearance of large numbers on the verandah of their home, and who was naturally anxious to learn whether they were harmful. They appeared in hundreds, crawling over the verandah and up the walls, and even entering the house. Similar invasions occurred in this locality for several years.

On April 6th, 1924, Mrs. Pigott wrote:—"The *Boreoides* yearly haunt our house for a few weeks, in myriads. I placed a box and some decayed wood on the verandah, where they thronged, and many eggs were deposited." In another letter—"The insects come in dozens over the edges of the verandah at both sides of the house every morning. We swept them into pans and drowned them. On one occasion we placed a large number in a bucket of water, where they remained from Thursday morning until Saturday. I then poured them out on to a sheet of paper to dry, before burning them; but in the afternoon I found them all alive, crawling over each other and laying heaps of eggs."

In May of this year I found these flies in similarly great numbers at Mentone, crawling over the verandah and up the walls of a house, and on the trunks and branches of trees and shrubs in the garden. The bodies were greatly distended with eggs, which they were depositing in cracks and joints of the hardwood weatherboards and flooring. In many instances, so firmly was the abdomen wedged into the openings, that it required some care to remove them without injury. Although a careful search was made, only one male was found.

In company with the *Boreoides* were several specimens of a small parasitic Hymenopterous fly, apparently a species of Evaniidae, shiny black, with extremely long, curved abdomen. In two instances these had their abdomen deeply inserted into small cracks in the weatherboards, apparently parasitising the eggs of the *Boreoides*.

The Victorian Naturalist

VOL. XLIII—No. 6. OCTOBER 5, 1926. No. 514.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held on Monday evening, September 13th, 1926. The President, Mr. E. E. Pescott, F.L.S., occupied the chair, and about 70 members and friends were present.

CORRESPONDENCE.

From Mrs. James Yeates, Bairnsdale, suggesting that the Club should take action with a view to having Mallacoota and its environs declared a sanctuary. On the motion of Messrs. C. Daley and H. B. Williamson, it was decided that this matter be referred to the Committee.

REPORTS.

Reports of excursions were given as follow:—Black Rock, Mr. H. B. Williamson, F.L.S.; Cheltenham, Mr. J. Wilcox; Sherbrooke Gully, Mr. E. E. Pescott, F.L.S.

ELECTION OF MEMBERS.

On a ballot being taken, the following were elected:—Miss A. Butler, Alexandra Avenue, Canterbury; Mrs. T. H. Sarovich, White Horse Road, Surrey Hills; Miss D. Ross and Miss E. Colebrook, Church of England Girls' Grammar School, South Yarra; Miss A. Paterson, 275 Bay Street, Port Melbourne, and Mr. W. Ramm, 654 Station Street, North Carlton, as ordinary members; and Mr. Eric Haslem, Bluff Road, Sandringham, and Mr. Andrew Taylor, Estella Street, Glen Iris, as Associate members.

GENERAL.

The President referred to the invitation extended by the combined Progress Associations of the Shire of Fern Tree Gully to an inspection of Sherbrooke Forest and a Conference to be held at Belgrave on September 18th, and requested as many members as possible to attend.

Mr. A. D. Hardy explained that the delay in proclaiming Sperm Whale Head a sanctuary, was due to the desire of M. F. Lewis, Chief Inspector of the Fisheries and Game Department, to include a larger area than was originally contemplated.

PAPERS.

"Some Notes From a Diary of Allan Cunningham," by Mr. C. Daley, B.A., F.L.S., being extracts from a journal in which this botanist recorded observations during travels in Queensland and Norfolk Island.

"Around the Yan Yean," by A. E. Rodda, in which the author described various features of interest in this locality.

Dr. C. S. Sutton and Mr. C. Daley, B.A., F.L.S., gave short accounts of their recent visits to Queensland and Western Australia respectively.

EXHIBITS.

By Miss J. Raff, M.Sc., F.E.S.: Photograph of Processionary Caterpillars taken in Western Australia; also specimens of the caterpillar.

By Mr. G. Coghill: Cultivated specimens of *Micromyrtus ciliatus* (Fringed Heath Myrtle), and *Grevillea rosemarinifolia* (Rosemary-leaved Grevillea).

By Mr. E. E. Pescott, F.L.S.: Cultivated specimens of *Thryptomene, Calycina, Chorozema cordata, Eriostemon myoporoides, Hovea elliptica, Dendrobium gracilicaule, D. Beckleri,* and *D. Kingianum album.*

By Mr. D. Paton: Specimen of *Pterostylis nutans* (Nodding Greenhood), 20 inches in height, collected at Boronia.

By Mr. H. B. Williamson, F.L.S.: (1) Specimens of *Eucalyptus neglecta* (Maiden), "Omeo Gum," collected on the Buffalo River, by Mr. W. Mitchell (previously collected only in Omeo district). (2) Orchids collected at Boronia.

By Mr. A. E. Rodda: Branchlets of Boobyalla (*Myoporum sp.*), showing gall swellings, from Brighton Beach.

By Mr. C. Borch: Nineteen species of *Lycaenidae* ("Blues") from North Queensland, showing dimorphism in the females of *Ogyris zozine,* and including such rare forms as *Ogyris aenone, Miletus apollo, Arhopala wildei* and *Bindahara isabella.*

By Mr. C. Daley, B.A., F.L.S.: Surface limestone (concretionary) from Nullabor Plain; Ironstone nodules (concretionary) from Narrogin, W.A.; *Dryandra floribunda;* Native Pear, *Xylomelum occidentale;* and other botanical specimens from Western Australia; shells from N.-W. Coast, W.A.; from home-garden, *Lhotzyka genetylloides, Calytrix Sullivani, Micromyrtus ciliatus, Thryptomene Mitchelliana, Chorozema cordata, Brachysema lanceolata.*

NOTES FROM A DIARY OF ALLAN CUNNINGHAM.

BY CHAS. DALEY, B.A., F.L.S.

(Read before the Field Naturalists' Club of Victoria, September 9th, 1926.)

Among some letters and papers left by Baron von Mueller, forgotten for many years, and when re-discovered placed at my disposal for perusal, was an old notebook, which had served the purposes of a rough journal in which Allan Cunningham, the Australian botanist, recorded some experiences of his wanderings in the years 1828 and 1830.

The diary is very incomplete, some of it illegible, and consists of two parts: the first comprising some scanty particulars of a visit to the penal settlement of Moreton Bay in 1828; the second with an account of an excursion to Norfolk Island in 1830. The book has on it the words "Part of Allan Cunningham's Journal . . . with the Revd. Rt. King's kind regards, June 10th, 1868." I should think that this inscription denotes the donor of the book, and probably the date when it was given to the Baron. The Revd. Rt. King may have been a son, or a nephew, of Capt. P. P. King, with whom Allan Cunningham had sailed as botanist on surveying voyages to Western Australia, Tasmania, and New South Wales. This conjecture, if correct, may account for Mr. King's possession of the journal. The writing is very small and indistinct, and some words are unintelligible.

Allan Cunningham was born in 1791. He early evinced a liking for botany, and was employed to collect plants for Kew Gardens. He visited South America and New Zealand with this object. Coming to Australia, he accompanied Oxley in exploring the Lachlan and Macquarie Rivers, securing about 450 species of plants, many of them on the Blue Mountains. Then, as botanist, he accompanied Captain P. P. King on a surveying voyage to King George's Sound, Dampier Archipelago, and Goulburn Island, securing 300 species of plants. In the same year he visited the district about Illawarra, and again went with Capt. King to Hobart and Macquarie Harbor. During the next three years he explored and collected plants from Port Macquarie to Cambridge Gulf.

In 1822 the botanist again visited Illawarra, explored through the Blue Mountains to the head of the Macquarie, and discovered Pandora Pass, and the rich Liverpool Plains. In 1824 he explored the sources of the Murrumbidgee and the Brisbane River. The following year's wanderings included the Nepean River, then the Hunter River, above Pandora Pass, and further observation of the Liverpool Plains to the North.

In 1827, Cunningham, from Segenhoe Station, on the Upper Hunter, crossing Oxley's Track, entered new country, which, unpromising at first, led to a fertile valley and the discovery of the Gwydir and Dumaresque Rivers, and the far-famed Darling Downs. The Condamine River was named, and he endeavored to find a practicable passage over the ranges to Moreton Bay, the discovery of Cunningham's Gap giving the subsequent solution.

In 1828, with Charles Fraser and Capt. Logan, from Moreton Bay, Cunningham went up the Logan River, and ascended Mt. Lindsay; afterwards, from Limestone Station, on the Bremer, they penetrated the ranges through the Gap to Darling Downs, thus securing means of access from the coast to the Downs.

In 1829, his last Australian exploration, he reached the source of the Brisbane River.

Allan Cunningham did splendid work as a botanist and an intrepid explorer. In 1836 he was appointed Colonial Botanist of New South Wales. He died in 1839, leaving an honorable record of service in science and discovery. His name is commemorated in the Coniferous genus, *Cunninghamia*, and in the familiar Hoop Pine, *Araucaria Cunninghamii*.

Omitting the notes of the first expedition, only interesting, firstly, as giving a passing view of the penal station at Moreton Bay in 1828—a scanty settlement which Cunningham, with foresight, designates "the foundation of a large city ere long"; and, secondly, as marking a preliminary stage to the important discovery of an accessible route through the ranges from Moreton Bay to the Darling Downs, the following account of a botanical excursion to Norfolk Island is gleaned from the faded pages of this incomplete diary.

VISIT TO NORFOLK ISLAND.

The journal commences with the date of May, 1830. "The Barque, Lucy Ann, ordered to proceed with convicts to Norfolk Island." On May 4th the barque sailed on the voyage, Allan Cunningham having obtained permission to go on the vessel. As in a previous case, the barque was employed in removing convicts, of whom there were 50 re-convicted felons on board, to be taken to Norfolk Island, under the charge of an officer of the

39th Regiment, and his men. With favorable winds, the barque made progress, and on May 7th passed a remarkable rock called Bate's Pyramid, a few miles southeast from Lord Howe's Island. With fine weather, a strong current swept the vessel upwards of 70 miles beyond the position assigned her by reckoning.

At sunset Norfolk Island was sighted, and as the vessel lay to between it and Phillip Island, at the southwest extremity, a flag was hoisted on shore. Landing could not be effected owing to the strong winds prevailing, which caused huge breakers. Allan Cunningham, anxious to land, worked round in a boat to Cascade Bay, from which he walked to the Sydney Bay side, about four miles distant by road. Here he first observed the vegetation. He noticed plants similar to some that he had seen in New Zealand, "the golden fruit of the lemon and guava . . . exhibiting a rich and pleasing diversity when contrasted with the extremely beautiful dark hue of the prevailing laurel-like foliage of the plants." Phormium tenax was frequent more particularly on the rocky cliffs of the island. *Dodonæ orientalis* and *Arecas* or Palms were seen. "The robust climbing plant, *Pandonœa,* originally noticed by Sir Joseph Banks, at the discovery of the island by the immortal Cook, and of which a drawing was made by Mr. Fred Bauer on his visit here in 1804" was in full growth. Only female flowers had then been obtained. "This deficiency," says the botanist, "it was extremely gratifying to me to supply in 1827, when I gathered fine specimens of the male and female flowers in September from the swampy Kahikatoa woods of O'Kianga and Cowa Cowa, where the plants, with the rooting stems, twist themselves up to the very summits of the lofty pines, where not infrequently they attain the height of 120-150 feet. The whorl bracts which are fleshy, are so much sought after by the New Zealanders who devour them with avidity, or any of the saccharine matter they contain, that I recollect I had no small difficulty in obtaining perfect specimens, notwithstanding the great abundance produced by each plant."

Cunningham waited upon Colonel Moment, the Commandant, who gave him a warm welcome, and approved of his object. A constable well acquainted with the island, was ordered to attend him on his daily excursions. For the next two days the strong winds prevented communication with the vessel, but on the 14th, the weather moderated, and "the prisoners, soldiers and baggage were safely landed." On June 1st the weather was boisterous. An excursion was made on the west side of the island to Mount Site, estimated at 1,200 feet in height, where there were deep and shaded ravines, with ferns and mosses, and as Cunningham hoped, new species of plants.

Desiring, if weather permitted, to spend a few days in examination, he was accompanied by an officer of the 39th Regiment, "who, availing himself of my tent to pass a night or two in, promised himself a long day's hunting with his dogs on the cliffs beneath the mountain where the few wild goats that remain on the island take shelter." The tent was pitched on cleared ground about 5½ miles on Anson's Bay Road. Hanson formerly occupied it, and gave the name to the bay at the foot of the mountain. From June 4th to 7th there were clouds, wind, and showers, five wet days preventing much collecting.

Cunningham notes that the thermometer did not fall below 65 degrees, nor rise above 68.5 degrees in the 24 hours. A slight break was followed by showery weather, then soaking rain on the Sunday. On Monday the weather was fair, thermometer 67 degrees. He examined the neighbouring brushes, hoping to find the flowers advanced by the rain. He observed *Blackburnia pinnata* (Forster), *Elatostema*, with female flowers, *Myrsine urceolata* (flores polygami) with permanent flowers, *Acalypha morioides*, and *Sapindus laurinis nitidis* without flowers. In a five-mile walk there was little change. In a ravine under Mt. Pitt the *Pandonæa* was bearing fruit. On June 8th, in an excursion along Anson's Bay Road, he saw the Bloodwood, *Croton laurinus*, *Elatostema*, *Zieria laurina*, *Morinda macrophylla*, as the most abundant species of plants, and in the shaded wood a *Euphorbia*, a beautiful *Aspidium* with fruits, and a *Clematis* with diæcious flowers.

On June 9th the botanist intended to go to Phillip Island, but the weather was very adverse. "In my walks through the thickets," he says, "I met with a timber-tree bearing its fruits which I had not previously seen. Its fruit was a five-winged capsule, supported on a long pedicle, beneath which was a persistent calyx. It rose to a tree 50 feet high, and its timber was of close grain and hard. The fruit of *Croton laurinus*, or Bloodwood, was also gathered to perfect my specimens. The tree suspected to be *Blackburnia* (G. Forster) is now in fruit, the character of which it is most desirable to know, as it appears that able naturalist, when he framed the genus, was entirely ignorant of the character of that part of its fruits. . . . It attains 40 feet." "On its trunk grew a small single-leaved plant of the *Epidendra*, very similar to my *Dendrobium* from the Five Islands, N.S.W. In returning home I gathered a paper of the ripened seeds of Luzuriaga. (See Br.)."

On Saturday, June 12th, Cunningham was preparing for the excursion to Phillip Island. Rough weather again intervened, the surf was considerable, and postponement was necessary; so, instead, he went to the north-east of Norfolk Island to Steele's Point, taking the Cascade Road to the Coffee Tavern, or Drandt's Farm. He found the bush dense, difficult, and almost impenetrable, the soil soft and spongy. The wild offspring of poultry left on the island by original settlers, roosted on the trees, and fed at daylight or evening. The North-East Point was reached in an hour. The cliff was 200 feet in height, but his friend descended them. He met only a plant of bushy herbaceous growth of the Amaranthaceae, Cyperus-looking, with Xerotes leaves (the razor-grass). He gathered duplicate specimens of *Polygonum fruticosum*, and of *Hovea monoica*, stamens eight.

It was not until June 17th that conditions were favorable for landing on Phillip Island, at a rock on the north side of a small bay. A camp was made for two or three days. The botanist ascended an acclivity to a ridge, destitute of soil; and in two hours' walking traversed the circuit of the island, which was lofty in the south, one point rising to a roundabout cone of red earth, probably about 1,200 feet above sea-level, devoid of trees or shrubs. The coast had steep cliffs on all sides. In the interior were some deep, wooded hollows, with plants similar in character to those of Norfolk Island. The rambling, thorny *Capparis* was generally distributed, rendering the scrub hard to penetrate on account of its thorns. The paths of swine and of goats were numerous. He was disappointed at not meeting herds of each animal, which had been in undisturbed possession of the island for twelve months. No pigs were seen, but a few goats were on the steepest parts of the cliffs. Four males were killed, and a female was captured for milking.

Only two plants different from those of Norfolk Island were observed, an *Hibiscus*, like that of Port Macquarie, and a *Polygonum*, like that of New Zealand. The

Capparis, with abundant fruit, like unripe lemons, was also in flower. *Blackburnia* in flower confirmed the opinion formed of the *Apocyneæ*. The fruit was eaten by the wild swine. A small, slender, brambled shrub, with 3-lobed leaves like *Lasiopetala* of King George's Sound, or the white-thorn of Great Britain, was seen, but not in flower or fruit. It might be the *Plagianthus* of Forster, New Zealand.

Rain set in for four days. On June 30th, it cleared, and having returned to Norfolk Island, Cunningham again went over the Cascade Road, and thence over a new cross-line of road to find some plants "yet *desiderata*" of his herbarium, or to clear up doubts in regard to genera, etc. He states:—"I was really gratified to find the slender tapering tree with large glossy leaves, which I had suspected to be *Rubiaceae*; and even of the genus *Morinda*, advancing to a flowering state, and although the umbelliferous panicle it had pushed forth was among its magnificent leaves, it was exceedingly young. I observed enough to settle its genus. It is an unpublished *Aralia*. The Soft Whitewood remains still as it was, as there is no flower or fruit. Its genus I have yet to discover. On examining again the *Alyxia*, still in flower, I clearly made out two distinct species, the one with greenish ovate-lanceolate leaves, and smooth panicles, the other with obovate, elliptical, quaternate leaves and downy branches. The *Aralea* (*spathulata*) has the soft, sappy wood, scarred trunk, and small and crowned fruit of the genus. The plant taken for *Exocarpos* (saligna) is clearly a specimen with handsome flowers. Gathered more of the *Viscum*, growing on *Pittosporum microcarpum*, everywhere in flower. *Rugosia* (?) are now in young fruit. Gathered some *Guinea-grass* to examine."

The first three days of July were stormy. On the 3rd Cunningham visited Anson Bay, the thermometer varying little, 62 degrees—68 degrees. He writes:—"In this excursion of six months from the settlement, I added no specimens . . . not previously procured, but I gathered fresh ones." He has a note about a curious land-snake that was thrown up. The lower jaw had fangs. The reptile was 30 inches in length, and had two claw-like appendages at the extremity of the tail to assist in springing."

On July 5th, in a walk in the neighbourhood of the settlement to the north-east, the botanist noticed

Forster's *Buphthalmium uniflorum* in flower; Monkswell, growing on cliffs and flats, in flower and fruit; and *Aralia spathulata* everywhere, in flowering condition.

On July 6th the weather became fine, but again broken and stormy. On the 12th, he visited the road to Bates's Bay. A dense brush, with Guinea-grass, was on each side, and Soft Whitewood, or *Hibiscus Patersoni*, was more frequent on the roadside than elsewhere. *Laurus, Croton,* and *Solanum* were observed, also *Dendrobium* growing on old timber.

The botanist was satisfied that he had gathered every plant the island produced. He writes:—"The period is now drawing near when a vessel from the colony may be expected, by which it is my intention to return to Sydney, with the small collection of trees, dried plants, etc." One might infer that he was somewhat disappointed with the results of his excursion to the island. A list of plants, with brief notes, is appended to the diary. Sixty-two species of flowering plants, and 13 Filices, are listed, also 34 exotics.

	Synonymous with
Dodonæa orientalis	*D. viscosa.*
Blackburnia pinnata (Forster)	*Zanthoxylum pinnata* (Linn.).
Elatotostema	Probably *E. lignescens.*
Sapindus laurinus nitidis	Probably *S. marginatus.*
Zieria laurina	Probably *Z. aspathaloides.*
Morinda macrophylla	*M. citrifolia.*
Luzuriaga	*Geitonoplesium cymosum* (A. Cunn.).
Polygonum fruticosum	*Atraphaxis lanceolata* (A. Cunn.).
Hovea monoica	*H. longifolia.*
Exocarpus saligna	*E. phyllanthoides.*
Pittosporum microcarpum	*P. eugenioides.*
Rugosia (?) *Rugelia*	*Senecio.*
Buphthalmium uniflorum	*Wedelia Forsteriana* (Forst.).
Hibiscus Patersoni	*Lagunaria Patersoni.*

The Orchids of Victoria

BY EDWARD E. PESCOTT, F.L.S., F.R.H.S.

Part II.

TRIBE 3. ARETHUSEAE. Anther lid-like, incumbent, usually deciduous. Pollen granular or mealy. Terrestrial, or rarely epiphytes. *Stems* in Australian genera *leafless* at the time of flowering.

1. GASTRODIA, R.Br.

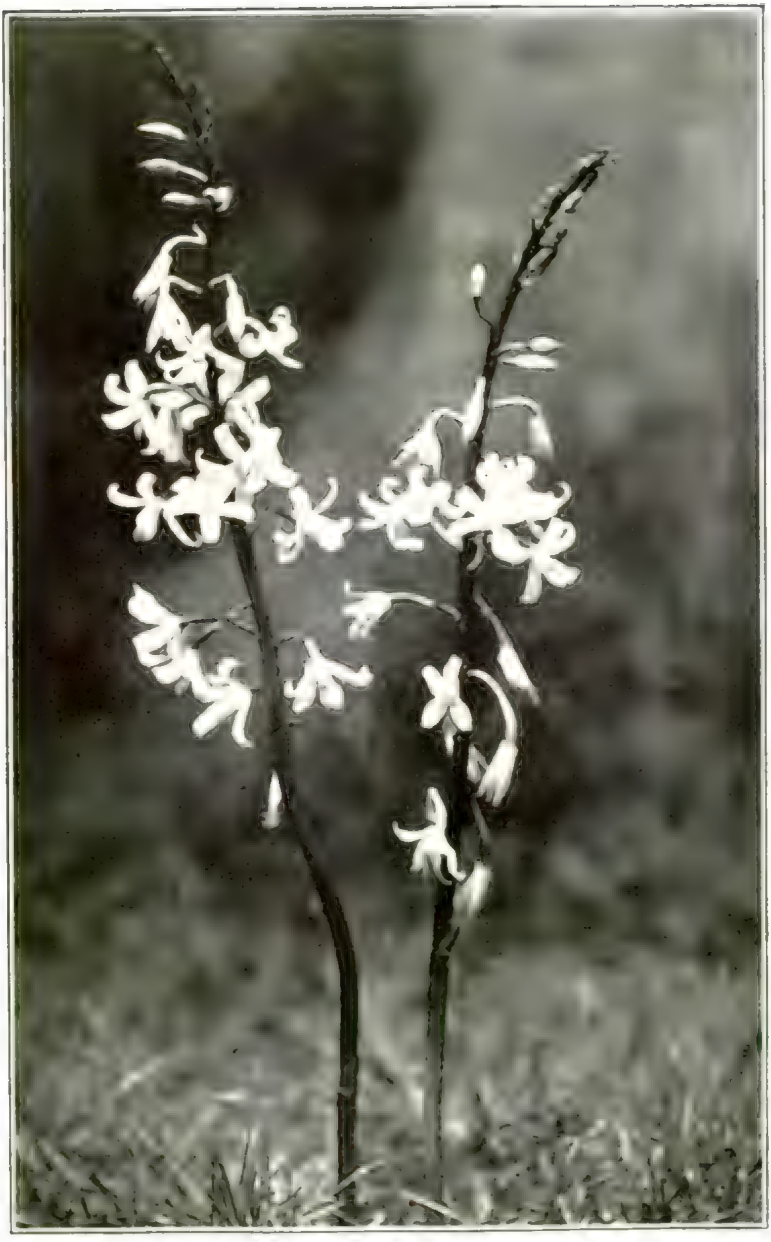
Sepals and petals united in a 5-lobed tube or cup. Labellum shorter than the perianth, entire, with 2 obtuse auricles near the base, oblong, the margins undulate (wavy), the disc with 2 longitudinal raised lines or plates, confluent upwards into a single one. Column elongated, with a membranous margin. Anthers lid-like, incumbent. Pollen granular.

Herbs, leafless, not green. Scapes simple and erect, with short loose sheathing scales. The genus extends to New Zealand, Malay Archipelago, Formosa, and Japan. Sometimes recorded as parasitic; but considered by Noel Bernard to be living in association (symbiosis) with a fungus, which stimulates its growth, causing it to grow and flower periodically. The name means a swollen column.

1. GASTRODIA SESAMOIDES, R.Br. "Potato Orchid." Stems from 1 to 3 feet in height, brown, with sheathing scales abundant at base, distant higher up. Raceme erect, up to 6 inches long, having from 2 to 15 or more flowers. Flowers white and brownish, on short pedicels Perianth $\frac{1}{2}$ inch long. Labellum about as long as perianth, broadly oblong, obtuse and undulate.

Found chiefly in open hilly country, and occasionally in dense forests, especially in moist situations. Recorded from all parts of the State except the N.W.; also from Queensland, New South Wales, and Tasmania. The tall brown stems, crowned with creamy-white and brown flowers, are conspicuous and very beautiful. The tubers are of various sizes, not unlike small potatoes. They do not flower every year. I have gathered the flowers in one season, and in the two following seasons, flowers did not re-appear. The large tubers often break up naturally into smaller ones, which do not flower either till of sufficient size or till stimulated by the fungus.

Plate VII.



DIPODIUM PUNCTATUM, R.Br. Hyacinth Orchid.

Sometimes the stems are somewhat bent over, or even twisted, the flowers hanging downwards at various angles. This appearance has led collectors to consider that there may be two species; but physiologically, both flowers are the same.

TRIBE 4. NEOTTIEAE. Anther erect or bent forward, persistent, but free from the rostellum (beak). Pollen granular or mealy. Terrestrial herbs with simple stems, bearing one or more leaves, rarely leafless, and a single spike raceme or single flower.

To this tribe belong the very large majority of Victorian orchids, all but the six species previously enumerated. They all possess tubers or tuberous roots, and require soil or humic material for their sustenance.

1. CALOCHILUS, R.Br.

Perianth segments free. Dorsal sepal broad, erect, hood-like; lateral sepals broad, acute. Petals shorter than the sepals. Labellum exceeding the other segments in length, sessile, with a triangular lamina, *densely bearded with purple or metallic-coloured hairs.* Column quite short and broad. Anther terminal, with a blunt beak, 2 celled. Pollinia 4 or 2, each deeply bilobed and granular. Terrestrial herbs, with tubers. Leaf solitary, linear, channelled. Flowers few or numerous in a loose raceme.

This is a small genus of orchids, there being only six species; four are endemic to Australia. Two of the Australian species also occur in New Zealand. New Caledonia has a species. Five are found in Australia, four of them being Victorian. The genus is noted for its long triangular and beautifully hairy labellum. The name means "beautiful lip," but a more appropriate one would be bearded-lip.

Recently, in Victoria, a *Calochilus* was found without any hairs on the lip. As only a single specimen was collected, it may only be an aberrent form of one of the species. Should it be found, and in any number, then it will be a new species, and perhaps a new genus.

1. C. PALUDOSUS, R.Br. (belonging to marshes). "Red-beards." Column wing without dark gland on each side near base of column. *Tip of labellum ligulate* (strap-shaped).

Found in N.E., S., and W.

The tip of the labellum is bare, and not unlike a small thin strap end. The hairs on the labellum are purple or purplish brown.

2. C. ROBERTSONI, Benth. (after J. G. Robertson, a Victorian botanist). "Brown-beards."

Column-wing with dark gland on each side near base of column. Tip of labellum without ligulate process, *whole surface of labellum hirsute.*

This is the most common Victorian species, being recorded from all districts. Occasionally plants are found very robust and tall. It is perhaps the most robust of the four species.

3. C. CUPREUS, Rogers. (Copper coloured bracts and flowers). "Copper-beards."

Column wing with dark gland on each side near base of column. Tip of labellum with ligulate process, labellum not hairy at base. Base of labellum oblong, *glabrous with several raised longitudinal lines.*

This species is recorded in Victoria, only from the Grampians. Its coppery colour is very noticeable. The leaf is shorter and more rigid than in the other species. In section it is triangular, while the others are crescentic. The raceme bears a large number of flowers, from 8 to 15.

4. C. CAMPESTRIS, R.Br. (belonging to the fields.) "Peak Beard-Orchid."

Column wing with dark gland on each side near base of column. Tip of labellum with ligulate process, not hairy at base. Base of labellum *smooth and thickened without raised longitudinal lines.*

This species is recorded from the N.E., S. and S.W. In Victoria it is a slender plant, carrying very few, often only 2 or 3, flowers. The bare strap-like end of the labellum is noticeable.

All species of the *Calochilus* are spring-flowering orchids, occurring usually from mid to late spring. They all have a single, robust glabrous leaf, with occasionally small, leaf-like bracts on the stem. They produce abundance of seeds, but, from the comparative rarity of the plants, very few seeds apparently germinate. The tuber is replaced annually, with occasionally an additional one or two alongside.

2. THELYMITRA, Forst.

(The name means "wearing a woman's headdress"; referring to the hairy appendages to the hood of the column.)

Sepals and petals (perianth segments) all similar and spreading: *the labellum similar to the other segments.* Column erect, of medium height, and widely winged.

The column wings shortly united in front at the base: produced on each side of the anther into an appendage, sometimes entire, sometimes plumed or decorated with excrescences; commonly produced over and behind the anther, *so as to form a* more or less complete, and often bi-lobed *hood.*

Terrestrial glabrous herbs, with round, or very often ovoid tubers. Leaf solitary, generally elongated and fluted, rarely wide. Flowers one to many in a terminal raceme. Colour usually in blue shades, sometimes yellow, pink, and red. White or albino forms are occasionally seen.

The species of this genus generally present difficulties of determination, especially to the beginner. The differentiations are found in the form, structure and positions of the various parts of the column, which is very distinct in this genus. The position of the wings of the column, the shape and position of the lobes, the position and even the colours of the hair tufts, and the presence or absence of these tufts are the principal guide features which assist in determining the various species.

As a rule, the flowers require the warmth and bright light of the sun to cause them to expand: hence the name "Sun-Orchids." For photographic purposes, it will often be necessary to stand the flowers close to a bright warm light. They will then open freely.

This is a typical Australian genus, but it is not endemic, as it extends to New Zealand, New Caledonia, and even to Java. Over thirty of the species are endemic to Australia.

KEY TO THE SPECIES.

A. (a) Column wings produced at the sides of and behind the anther so as to form a hood: the *lateral lobes being pencillate* (bearing hair tufts).
   (b) The hood with 3 short denticulate lobes between the pencillate ones.

Species 1, 2, 3.

B. (a) As before.
   (b) Hood with 1 entire or bifid (notched) lobe between the pencillate ones.

Species 4.

C. (a) As before.
   (b) Lobe between the hair tufts bifid or emarginate.

Species 5, 6, 7, 8, 9.

D. (a) (b) Hood deeply toothed or fringed, *without pencillate lobes*, with a club shaped appendage on the back.

Species 10.

E. (a) Column wings produced behind the anther, truncate (shortened), not hood shaped, *their lateral lobes not bearing hair tufts.*
(b) Wings at the back higher than the anther: lateral lobes nearly horizontal, and more or less rugose (roughened).

Species 11.

F. (a) As in E (a).
(b) Wings at back *not* so high as anther: lateral lobes *very small*, much exceeded by the *thick* pubescent anther-point.

Species 12.

G. (a) (b) Column wings not produced behind anther; lateral lobes erect or almost so, and generally as high as the anther.

Species 13, 14, 15.

1. T. IXIOIDES, Swartz. (Ixia-like) "Dotted Sun-Orchid."

Middle lobe of hood shorter than the two others, crested on back: *hair tufts white.* Flowers about 2 to 6, light blue, *the dorsal sepal and petals dotted.* Leaf long, narrow, channelled.

Found in open and scrubby country in all parts of the State, flowering in spring. The dotted flowers form an easy identification. Sometimes pale lavender forms are seen.

2. T. EPIPACTOIDES, F.v.M. (Epipactis-like). "Stout Sun-Orchid."

Middle lobe of hood longer than adjacent divisions, the latter incurved, smooth on back: *hair tufts white.* Flowers greyish green, greyish white, or light brown with a metallic sheen. A strong robust plant, often up to 18 inches in height. Leaf long, fleshy, tubular at base. Stem bracts 1 or 2, quite fleshy and leafy.

Usually found in swampy country. Reported from Cheltenham, Grampians, Ocean Grove, Point Lonsdale and Jan Juc. Flowers in September and October.

3. T. CANALICULATA, R.Br. (channelled, leaf). "Pale Sun-Orchid."

Middle lobe of the hood smooth on the back. Central lobe of hood broader than in *T. ixioides*, no dorsal crest, and much denticulate.

This is a slender plant, with much paler flowers than T. ixioides, the leaf being long and narrow. Found in the S.W., S. and N.E.

4. T. LUTEO-CILIATA, Fitz. (Yellow hair tufts.) "Fringed Sun-Orchid."

Lobe between hair-tufts undivided or with crenate margin. Upper border middle lobe convex, crenate: *hair tufts yellow*: flowers pink or light red, usually 2 to 5, opening only in sun.

A slender plant, usually growing freely in colonies. The *reddish colour* and the *yellow hair tufts* are conspicuous guides to the species. The seed pods are unusually large, and possibly the seed germinates freely. Recorded only from Lubeck and Baxter. Flowers in September and October.

5. T. GRANDIFLORA, Fitz. (large-flowered). "Great Sun-Orchid."

Crest of middle lobe much higher than hair-tufts, its profile falcate (sickle-shaped). Column erect and high, wings wide and inflated, *hair tufts white.*

A very robust species, 15 to 30 inches high. *Leaf* wide, lanceolate, *thick, sheathing* for several inches at the base. Stem bracts strong, 3 or 4, lower ones leaf-like. Flowers blue or purplish blue, numerous in a long raceme; over an inch in diameter.

Flowers in September and October; recorded from Ringwood, Ocean Grove, Paywit, Marcus Hill, Mooroodue, Point Lonsdale, and Grampians: also from Sth. Australia.

6. T. ARISTATA, Lindl., (bearded, i.e., hair tufts). "Scented Sun-Orchid."

Middle lobe of hood dilated, its crest level with the hair-tufts, which are white. Intermediate lobe cup-shaped, dilated, *dark brown* towards the back, *yellow* towards the front, sometimes red-brown, having a V shaped notch in the centre.

A medium stout plant, from 12 to 16 inches in height; leaf sheathing at base, wide, lanceolate, rather flat. Flowers usually *sweet scented, mauve,* pale blue, or *lavender,* perianth segments elliptical-lanceolate. A fairly common species, flowering all through spring, opening freely in the sun. Recorded from all districts but the N.W., often very common in the N.E., being found in hundreds, frequently along railway lines. Found in all States except Queensland.

7. T. MEGCALYPTRA, Fitz. (Large-hooded). "Lilac Sun-Orchid."

Pencillate lateral lobes of the column wings usually shorter than the middle lobe. Middle lobe quite *yellow*, much inflated; middle lobe not denticulate nor crested, pencillate lobes spreading.

Flowers lilac or pale blue, fairly large, the plant not tall, often not exceeding 1 foot in height. Pink forms are occasionally seen. Recorded only for Grampians; also from New South Wales.

8. T. LONGIFOLIA, Forst. (long leaved). "Common Sun-Orchid."

Middle lobe only slightly notched, somewhat tubular, *very dark coloured* except at margin, not dilated as in *T. aristata*. Hair tufts *white*, bent upwards.

A species of variable height, from 9 to 24 inches high; generally slender, leaf often long and quite narrow. Flowers blue, from 1 to 8 in raceme, usually few; not scented. Perianth segments acute. Flowers all through spring, and often found associated with *T. aristata* and *T. ixioides*. Opening freely in sunshine. Recorded from all districts: and from all the other States.

This and the former species are frequently found along railway enclosures in the north-east part of the State, in great profusion. Presumably the abundance is due to the periodic burning off of the grass and plants along the railway line, the orchids being stimulated into bloom.

9. T. PAUCIFLORA, R.Br. (few-flowered). "Slender Sun-Orchid."

Hair tufts *white*, turned upwards. Middle lobe *brownish, very deeply and narrowly cleft*, the divisions rounded, entire; crest rather higher than the hair tufts.

Flowers recorded for South Australia as blue, often dark blue, but in Victoria they are usually very pale blue and *often white*. Flowers quite small, one to three on stem, which is slender and from 5 to 9 inches high. Rarely opening except in bright sunshine. Recorded for S., S.W., and N.E., and also from South Australia, New South Wales, and West Australia.

10. T. FUSCO-LUTEA, R.Br. (brown-yellow). "Blotched Sun-Orchid."

Column short; wings voluminous.

A stout robust plant, 6 to 18 inches high, with a single *very wide,* ovate to oblong lanceolate leaf, sheathing at base. Flowers 2 to 6, large, *yellowish,* marked with *dark brown* spots or blotches, about 1 inch in diameter.

A Western species, recorded in Victoria only from the Grampians and French Island. Flowers in late spring and early summer, and perhaps on that account, it has been missed in other localities. It is worth searching for, as it is one of our unique and striking orchids. Recorded also from South and West Australia.

See "*Naturalist*" for January, 1921, for illustration.

11. T. CARNEA, R.Br. (flesh-coloured) "Pink Sun-Orchid."

Column wings produced behind the anther, laterally, into 2 *denticulate* and more or less roughened *yellow* horizontal lobes, not bearing hair tufts. Intermediate lobe broad, *reddish.* Slightly denticulate and rather higher.

A very slender species, from 6 to 9 inches in height. Leaf channelled, very slender and narrow. Flowers 1 to 3, small, pale pink to bright red, opening only in the sun. Recorded from all districts except the N.W. Often common in grass-land, but inconspicuous except when open. Flowers in late spring. Recorded from all States except Queensland.

12. T. FLEXUOSA, Endl. (flexuous, or zig-zag stem). "Twisted Sun-Orchid."

Column erect, not hooded, widely winged, the wings only slightly produced at the sides into rounded dentate lobes. Intermediate lobe slightly notched; all lobes shorter than the anther.

This is a very slender plant, with wavy or zig-zag wiry stem, having a small almost terete leaf. Flowers small, 1 to 3 on stem, yellow, opening only in very warm sunshine, and then only for a short period. Height about 6 to 8 inches.

Fairly abundant in grass lands, and recorded from all parts except the N.W. It is an insignificant plant, and often is passed unnoticed, owing to its usually unopened flowers. Found also in South Australia, Tasmania, and West Australia.

13. T. ANTENNIFERA, Hook.f. (bearing antenna). "Rabbit-ears."

Lateral lobes smooth, *reddish brown,* emarginate, higher than the anther. Column not hooded, broadly winged.

Not to be confused with the preceding species, this species being stouter and larger flowered. *Leaf terete*, longer than in Species 12. Flowers 1 to 3, rich yellow, with a brownish stripe on the outside: very sweetly scented, and opening more freely in sunshine than the previous species. A *red variety* has been recorded.

The unusual brown appendages produced by the wings, which look like the antennae of an insect, have given occasion to the common name, "rabbit ears." It is recorded from S.W., S., and N.W. It really should be collected in other districts; for it is fairly abundant, and is found also in South Australia, Tasmania, and West Australia.

14. T. MACMILLANII, F.v.M. (after Thos. Macmillan): "Salmon Sun-Orchid."

Lateral lobes of column *denticulate, yellow*, much higher than the anther. Leaf narrow linear, 2-4 inches long; stem slender, tough and about 6 inches high. Flowers opening freely, 1 to 4 on stem, *salmon-red* in colour.

The colour of this species distinguishes it from all others, although it must not be confused with *T. fusco-lutea*. In the latter species, the yellow hair tufts distinguish it, also the smaller flowers. This species also should not be mistaken for the red forms of *T. antennifera*. This latter species has the unmistakable "rabbit ears," which do not occur in *T. Macmillanii*. Recorded from the S. and S.W., chiefly near the sea-coast; also from South Australia.

T. VENOSA, R.Br. (veined, referring to the perianth segments). "Veined Sun-Orchid."

Lateral lobes *spirally involute*, neither rough or ciliate. Column erect, winged, but not hooded.

Flowers large, blue, the thin perianth segments *distinctly veined*. The labellum generally more marked, being more rounded than the other five segments. Leaf narrow, channelled; stem from 6 to 12 inches high, bearing 1 to 5 or more flowers.

This is usually an alpine plant, being abundant on the Baw Baws. It has not been recorded from the lower levels. Found also in South Australia, New South Wales and Tasmania.

THE GENUS *SPICULAEA*, LINDL., AND ITS TAXONOMIC RELATIONSHIPS.

By R. S. Rogers, M.A., M.D., F.L.S.

(*Communicated by E. E. Pescott*, F.L.S.)

This genus was established by Lindley in his Swan River Appendix, p. lvi. (1839), and was very properly separated by him from another of his Western Australian genera, *Drakaea*, which he published at the same time. It was then represented by a single species, *S. ciliata*, Lindl.

Nearly 20 years later, Baron von Mueller described a Queensland plant of similar habit; but, inasmuch as this differed from the Western species in the mode of attachment of the labellum to the column, a feature which Lindley had regarded as of generic importance, it was placed by the Baron in a new genus, which he called *Arthrochilus*. Subsequently Reichenbach, f. removed both these genera to Lindley's genus *Drakaea*. As Reichenbach's view was, unfortunately, accepted by Bentham, these plants secured an authoritative position as members of the latter genus in the *Flora Australiensis* and the *Genera Plantarum*. Although I have long looked askance at this unnatural relationship, it has remained for the German orchidologist, R. Schlechter, to disrupt it, and to reinstate Lindley's genus *Spiculaea*. If *Spiculaea* is to be included in *Drakaea*, it has always appeared to me inconsistent to exclude *Caleana*, Br., which seems to bear to it an even still closer relationship.

Schlechter has, very wisely, placed these three genera, together with *Chiloglottis*, R.Br., in a new group, which he calls *Drakaeinae*. This dislodges *Pterostylis*, Br., from the position very illogically assigned to it by Pfitzer, next to *Drakaea*. The order of sequence in the above group, which I hope Australian botanists will accept, is as follows: 1. *Caleana*, R.Br.; 2. *Drakaea*, Lindl.; 3. *Spiculaea*, Lindl.; 4. *Chiloglottis*, R.Br. This makes an easy and natural transition to the next group, viz., that of the *Caladeniinae*. As regards habit, the resemblance between the first three members of the group is undoubted, and especially is it striking between *Caleana* and *Drakaea*, in which the stem, perianth and fundamental characters of the labellum, are almost identical. The fourth member, *Chiloglottis*, forms the connecting link between the two groups mentioned, in a satisfactory manner, which could not possibly be expected from *Pterostylis*, in which both vegetative and floral characters are so very remote.

For divisional purposes the structure of the column and other features mentioned below, may be usefully employed.

1. *Caleana*, R.Br. Column conspicuously and widely winged throughout; usually with a definite foot. Leaf single, basal, elongated. Stem wire-like, stem-bracts (not including floral bracts) absent or single. Flowers one or more, *reversed*.
2. *Drakaea*, Lindl. Column wingless, except for a single, blunt, somewhat triangular auricle on each side; foot very conspicuous. Leaf single, basal, rounded, more or less orbicular. Stem wire-like, bract single. Flowers one, erect.
3. *Spiculaea*, Lindl. Column wingless, except for two acute subulate or falcate auricles on each side; foot usually conspicuous. Usually leafless at the time of flowering. Stem more or less fleshy, never wiry, stem-bracts more than one. Flowers multiple, sometimes *apparently* reversed.
4. *Chiloglottis*, R.Br. Column moderately winged throughout; footless. Leaves two, basal, well developed, elongated. Stem always fleshy, no stem-bract. Flowers single, erect.

I believe that the following circumscription will exclude all other members of the group, at the same time being sufficiently wide to include Eastern species of the genus.

SPICULAEA, Lindl.

Segments of the perianth narrow, somewhat similar, the dorsal one erect, the others more or less spreading or reflexed. Labellum articulated by a slender elongated claw, either almost directly to the base of the column, or to the apex of its elongated foot; lamina narrow, peltate, hammer-shaped or insectiform, the upper lobe simple emarginate, or divided into two long divergent filiform tails. Column elongated, slender, incurved, erect, or reflexed towards or against the ovary; provided on each side with two subulate or falcate auricles in its upper part; foot absent, very rudimentary, or produced into a long process which articulates with the claw of the labellum. Anther erect, bilocular, quite blunt. Rostellum rudimentary, unconnected with anther.

Small delicate terrestrial herbs, with underground tuber, generally leafless at time of flowering. Scape with more or less fleshy, never wiry stem, and two or more stem-bracts. Flowers about 2-8, racemose.

The genus readily lends itself for division into two sections, characterised as follows:

§1. Column-foot absent or rudimentary; upper lobe of labellum narrowly elongated, simple, undivided. EU-SPICULAEA.

§2. Column-foot conspicuously elongated; upper lobe of labellum simple and shortly pointed, or produced into two elongated divergent filiform tails. ARTHROCHILUS.

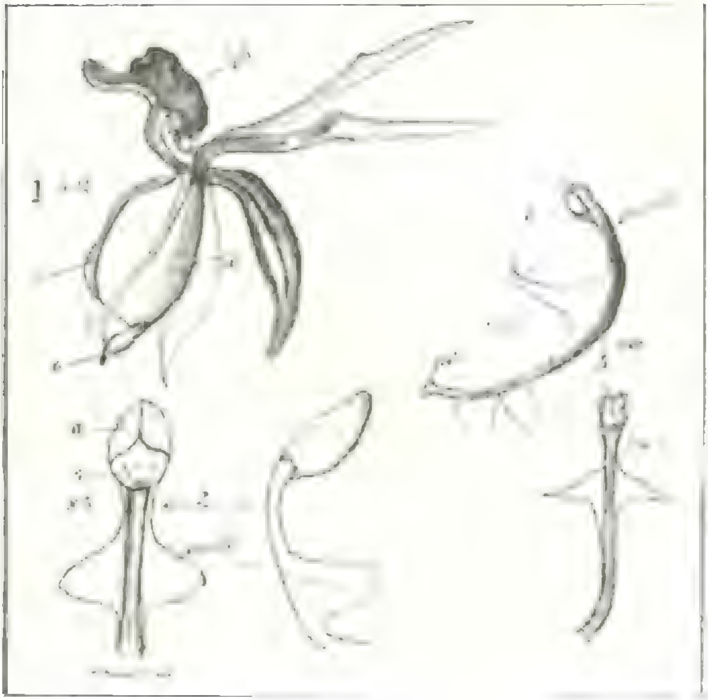


Fig. 1, *Caleana major*, R.Br. Fig. 2, *Drakaea glyptodon*, side and front of column. Fig. 3, *Spiculaea irritabilis*, side and front of column.

The first of these is represented, up to the present, by an isolated Western species, *S. ciliata*, Lindl., which has a single, basal, elongated leaf, withered or disentegrated at the time of flowering (November). The second has two known representatives in the Eastern States, viz., *S. irritabilis* (F.v.M.), Schltr., n. comb., and *S. Huntiana*, (F. v. M.), Schltr., n. comb. These are both summer forms and both are leafless at the time of flowering, although in the case of the first, a rosette of two or three elliptical ovate or oblong leaves is occasionally found at or near the base of the scape. So far no information is available regarding the leaf-system of *S. Huntiana.*

These three species agree well in habit, but in the case of the Eastern species a great degree of retraction is to be observed in the column, this structure being retracted at right angles to the ovary in one case and actually reflexed against it in the other, in both instances causing the flowers to appear reversed. In the Western species the column is erect, thus giving the flowers a normal attitude.

A differential table is appended, indicating the chief distinguishing characters of the published species.

Labellum articulated by claw, either directly to base of column or to apex of its very rudimentary foot. Column erect on ovary. Leaf basal lanceolate or ovate-lanceolate, withering off at time of flowering *S. ciliata.*

Labellum articulated at apex of elongated foot of column. Leafless at time of flowering, but rosette of leaves sometimes found near base of scape.

Column retracted at right angles to axis of ovary. Dorsal sepal greatly exceeding other segments. *S. irritabilis.*

Column reflected against side of ovary. Segments of perianth about equal in length. *S. Huntiana.*

A Western species of this genus is figured by Lindley in the Swan River Appendix, page lv., t. 4. An Eastern form, *S. irritabilis*, will be found illustrated in Reichenbach's *Xenia*, II., t. 189, and the third known species, *S. Huntiana*, by me in *Tr. Roy. Soc. S. Australia*, XLII., 1918, page 32, t. 4.

Distribution. Much remains to be learnt with regard to the distribution of these remarkable little plants. Apparently, only one species, *S. irritabilis*, penetrates the tropics. This is a coastal plant, with a considerable range along the east coast of Australia, extending from Rockingham Bay (latitude 18 degrees), to Moreton Bay, in Queensland, and Newcastle, in New South Wales, to Eastern Victoria. No specimen from a Victorian locality is included in the Melbourne Herbarium. It blooms in the late summer months of February and March.

S. Huntiana, so far as is known, is more restricted in its range, and is by preference a mountain dweller. It was first recorded from Mt. Tingiringi (5,000 feet), in New South Wales; and later from Blackheath (3,500 feet), in the Blue Mountains. In 1917 it was discovered in Victoria, at Cravensville, by that ardent orchidologist, Mr. A. B. Braine. I notice that its author, Baron von Mueller, refers to it as an autumnal plant, but all plants received by me from Cravensville (and they have been fairly numerous) bloomed in November and December. *S. ciliata*, Lindl., is only known to me from two localities in Western Australia, viz., York and Swan River, both places at low altitude in the South-west corner ot the State.

Thus, the curious fact is revealed, that the entire breadth of the continent (some 2,400 miles) intervenes between the easterly and westerly representatives of this genus, with up to the present, no records of intermediate forms to bridge this vast distance. It is of course possible, that a distributing centre may yet be discovered to the North, in Malaysia or Papuasia, but even then, such a discovery would leave many pertinent questions unanswered.

REPRINTS FOR AUTHORS.

The Committee, at its last meeting, considered the question of reprints of papers published in the *Naturalist*. The cost of reprints is considerable in the course of a year.

It was decided that, in future, 26 reprints (without covers) be supplied to the author of any technical paper, or one containing original records, etc.; and that authors of articles of general interest, should receive up to six free copies of the *Naturalist*, at the discretion of the Publishing Committee.

Authors of scientific papers who require reprints, are asked to notify the Secretary when submitting such papers for the Committee's consideration.

The Editor requests that contributions intended for publication in the Naturalist, should be typewritten, if possible; otherwise that they be written very clearly (on one side of paper only), and with proper spacing between lines. Crowded writing is very troublesome to type-setters, and often leads to errors.

During August, 1925, at Lilydale, I had a nest of the Mountain Thrush (*Oreocincla lunulata*) under observation for some weeks. Eventually a young bird was hatched, and seemed to thrive well for nearly a week. Revisiting the nest after an interval of two days, I was surprised to find that the fledgling had disappeared. Presently a fox calmly passed by within eight yards of me. The possibility of this animal being the culprit then occurred to me, and on the ground at the foot of the bush I discovered evidence of it having been there. As the nest was at a height of only 5 feet, in a thick Tea-tree, whose branches reached to the ground, the fox would find little difficulty in reaching it.—D. DICKERSON.

AROUND THE YAN YEAN.

BY A. E. RODDA.

(*Read before the Field Naturalists' Club of Victoria, September 13th, 1926.*)

On January 2nd last, a visit was paid to Yan Yean Reservoir. Proceeding along a road east from Whittlesea, our objective was a pine-clad ridge abutting on the north-eastern portion of the lake, and forming the nearest prominent landmark. Two small, murky creeks were passed at about half a mile from the township. One, visibly flowing, was the Plenty River. In justice to the Plenty, it should be stated that the bulk of its waters has been diverted to the Yan Yean some miles upstream.

The intake channel, constructed of blocks of dressed basalt, and half full of clear, dark-colored water hurrying on its way from the adjacent hills, was next crossed. Topping a steep slope to the pine ridge, we looked upon a deep valley, the main natural feeder to the basin from the north, and, at its southern end, bordered by a vivid green fringe of reeds and rushes, we gained our first view of the extensive blue waters of the Yan Yean. Approaching the margin, certain moving black dots on the water resolved themselves into swans, ducks, and other aquatic birds.

Across the valley the ground rises into a fine plantation of pines, and in their dense shade the next two miles were covered pleasantly, with the clear waters always close at hand on the right. In places the pines, which are mostly *Pinus insignis*, are intersected by fire-breaks, about 30 yards in width, and occasionally give place to small plantations of *Pittosporum*, Acacias, and native pines (*Callitris*). Many of the latter have sprung up as seedlings, and are graceful, sturdy little trees, from 3 ft. to 6 ft. in height.

The plantations always border the steeper slopes to the water, where, in most places, an apron of basalt spalls has been laid down, to reduce erosion. These spots are the favorite roosting-places of cormorants, for, on the tops of posts driven into the water, and also on fence-rails lining the margin, are dozens of spring traps, set ready for action. A ghastly collection of the remains of these ravenous fish-eaters was found in a thicket—a score or more decaying bodies of the Pied

Plate VIII.

Photo by R. T. Littlejohns.

RED-KNEED DOTTEREL, *Erythrogonys cinctus*, at Nest.

species, each with the upper mandible removed, as a token for the reward for destruction. In spite of the war upon them, cormorants still are numerous. A large flight of about 30 alighted in the water half a mile from shore, with an audible splashing. The glass revealed them to be the large black species (*Phalacrocorax carbo*), which has an almost world-wide distribution. Cormorants generally are considered to be silent birds, but the chorus of harsh croakings that greeted new arrivals showed that they can be vociferous.

Grazing not being permitted in the extensive reserve surrounding the reservoir, the grass is thick and matted. Evidence of rabbits was everywhere, and many were seen; but they appear to have made hardly any impression on the ground vegetation.

The pine plantation ends at an abrupt slope, overlooking another bay thickly overgrown with semi-aquatic vegetation. The tall pines on this point are the haunt of a number of Swamp Harriers (*Circus Gouldi*), and six of these large hawks were disturbed from one tree. As they glided over the marsh on widespread wings, the coots and waterhens, with shrill cries of alarm, rushed for cover beneath the dense growths. An attempt to take a short cut across this valley was soon abandoned, as the dead and living vegetation formed a crust above the damp slippery soil, and walking was too laborious. Accordingly, a detour was made round the head of the swamp, through open grassy land, where a hare was put up, and a pair of Kestrels (*Cerchneis cenchroides*) noted, hovering high in the blue.

On the further side, where the ground rises again, another plantation was entered. This consists mainly of Eucalypts, Acacias, and a few Casuarinas. The Eucalypts are mostly Blue Gums (*E. globulus*), and, as is customary with them in an uncongenial situation, many are in a dead, or half-dead condition; but the aspect is relieved by the presence of numerous self-sown saplings, in their delicate shades of bluish grey.

The birds of the Eucalypts were somewhat different from those observed in the pines. In and around the latter, Magpie Larks (*Grallina cyanoleuca*), Night Herons (*Nycticorax caledonicus*), Magpies, and Harriers predominated, while in the former, Honeyeaters of several kinds, the Black-faced Graucalus (*Coracina robusta*), Tree Creepers (*Climacteris*), Whistlers

(*Pachycephala*), and a host of smaller birds were noted. A pair of Restless Flycatchers (*Siesura inquieta*) arrested attention by their amazing vocal efforts. Harsh to a degree, their rasping rattling notes were most unbirdlike.

Turning towards the margin of the lake, a sudden commotion in the water revealed a large school of Perch, that had come so close inshore that their dorsal fins projected above the surface as they struggled towards deeper water. Our pause here also brought under notice an unusually large company of Musk Ducks (*Biziura lobata*). Twenty-four were counted as they quietly, but speedily, made for safer depths. With them were several Crested Grebes (*Podiceps cristatus*), and some lesser kinds, including the Hoary-Headed species (*P. poliocephalus.*) A few Dotterel ran briskly over the single, and at a distance a white bird (probably a tern) in flight, was seen indistinctly against the dark foliage of the further shore.

Another swampy valley was rounded, and another pine plantation entered. The pines being closely planted, are tall and straight. The topmost branches, almost meeting, form a perfect shade, where one is tempted to linger on a hot day.

A small clearing near here is partly overgrown with the dwarfed trees and shrubs of the Cherry Ballart (*Exocarpus*). On these were found many caterpillars of the Imperial White Butterfly (*Delias aganippe*). Some of those, preparatory to pupating, had spun a girdle of silk around their middles, to attach themselves to the plant-stalk. Others, completely pupated, were attached by the tail, and showed contrasting colors of dark brown and creamy-white. While observing these, we discovered that we were standing on the gravel-strewn nest of an aggressive colony of red ants, that were converging towards us on every side. By moving to different points around the nest the direction of advance of the ants was altered. One cannot but admire the reckless courage of these small defenders of their homes, as they unhesitatingly rush in against overwhelming odds.

Close by a swarm of winged termites was emerging from a decayed stump. Some of the small, yellowish workers had stationed themselves at the exit holes and appeared to be preventing the imagoes from re-entering. Wood Swallows in the air, and little slate-colored lizards on the ground, took a toll from this exodus. If the lizards fancied red ants they could get their meals more easily than by waiting for fallen termites.

Soon we arrived at the long dam-wall spanning the next valley. From here an artificial waterfall leads into the outlet channel, which stretches away almost to invisibility in a straight line towards the metropolis. We took the dusty road to the Yan Yean railway station, having encircled two-thirds of the reservoir, which, with its blue waters, pine-clad hills and green, watery valleys, is one of the most interesting and picturesque localities within easy reach of the city.

A notable feature of this spring has been the early appearance of some migratory birds around Melbourne. The nesting season, too, commenced much earlier than in many previous years. Though the Olive-backed Oriole (*Oriolus sagittatus*) usually arrives here in October, two birds were heard calling at Mooroolbark on September 12th, while on August 29th an Australian Snipe (*Gallinago hardwicki*) was flushed from the tussocks in a swamp along the Olinda Creek. The Black-faced Cuckoo-Shrike (*Coracina novae-hollandiae*) nested unusually early; a nest with two eggs was found on September 12th, at Mooroolbark, and others in process of building were noticed in the box trees nearer to Melbourne. —D. DICKERSON.

This spring has been a very interesting one as far as orchids are concerned, and many varieties have come to hand. A recent visit to Airey's Inlet (Rev. A. C. F. Gates, Leader) revealed the rare fleshy-lip Caladenia, *Caladenia cardiochila*, Tate, in considerable numbers, in the timbered country bordering the coast, also a few plants of another rarity, in hard stony ground, close to Anglesea—the specific name of this orchid is doubtful, but it may ultimately prove to be the rare blotched sun-orchid, *Thelymitra fusco-lutea*, R.Br.; a budded specimen was removed, and is now growing well.

The Hooded Caladenia, *Caladenia cucullata*, Fitz., has been received from Rushworth, Victoria (Mrs. Edith Rich). This is a notable find, and the specimens are exactly as Fitzgerald figured the species in *Australian Orchids*. The dwarf Caladenia, *Caladenia pumila*, Rogers, has been sent from Bannockburn, Victoria, by the original discoverer of the plant (Miss Pilloud). This "great white spider" is a glorious type. Another fine orchid from the same collector is the Salmon Sun-orchid, Thelymitra Macmillanii, F.v.M. —W. H. NICHOLLS.

Botany has always received ample space in the *Naturalist*, and now it is proposed to give ornithology a larger share than it has had hitherto. Members who are interested especially in birds, are invited to contribute field notes, and to submit photographs for consideration. The photograph reproduced in this issue, it is hoped, will be the first of many illustrations appealing, not to bird lovers only, but to all club members.

AUSTRALIAN THRIPS.

Up to 1914 very few species of Australian thrips were known. In June of the present year 135 species, comprised in 50 genera, had been described. Other forms are being studied. Many of the native species are attacking cultivated plants. I have taken several species in the Botanic and other gardens in and around Melbourne. Thrips of other countries are being introduced. In 1915 I took the European species, *Limothrips cerealium* (Hal), on wheat at Sydenham. There are several other instances of introduction, but far the greater number of species are endemic.

Mr. A. A. Girault, of the Agricultural Department at Brisbane, sends me the following note: "*Chirothrips Manicatus* (Haliday). This is the first Australian record of a well-known grain-insect. In the collection of the Department of Agriculture and Stock, I found a female labelled 'Thought to be associated with grain, Brisbane, February 27, 1912, Tryon.'" He also writes me about *Pseudanaphothrips achaetus* (Bagnall), which was originally described by Bagnall in 1914, as *Pseudothrips*; Mt. Lofty Ranges, South Australia, from (3) females. The co-types are in my possession. In 1918 Bagnall secured a male from Cottesloe Beach, Fremantle, Western Australia, and gave a further description in the *Annals and Magazine of Natural History*; and recorded females from the Blue Mountains, New South Wales.

The following is Girault's note: "Karny reported this species from the far north of Queensland (Mjoberg's expedition), and I have just turned up the following records:—A female, Bakerville, forest, March 15th, 1919 (light specimen). A male, nine females on strawberry flowers, Manly, Sept. 24th, 1924 (H. Tryon). Two females, strawberry, Beerwah, October 9th, 1920 (H. Tryon). A female, lantana flowers, Dec. 16th, 1925. Two females, flowers glycine tobacina, November 9th, 1925. One male, Wellington Point, flower strawberry. Localities in Queensland. Thus the species has spread to cultured and introduced plants. Nearly all the specimens were blackish, thorax sometimes reddish, antenna 3 and fore tibia pale."—REGINALD KELLY.

The Secretary of the International Commission on Zoological Nomenclature notifies that a new (English) edition of the *International Rules*, together with the summaries of "Opinions," 1 to 90, has been printed in the *Proceedings of the Biological Society of Washington, D.C.*, Vol. 39, pp. 75-104, July, 1926. Copies can be obtained from the Secretary of the Society. (Address: Bureau of Entomology, U.S. Dept. Agriculture, Washington, D.C.) Price, $1.00.

CHARLES HEDLEY.

Science has lost one of its most devoted and distinguished sons in Australia, by the death of Mr. Charles Hedley, F.L.S. And we, who knew him, have lost a friend, learned, of charming manner, and always modest in regard to his notable achievements.

Had Mr. Hedley elected to become a man of letters instead of a student of conchology and corals, he would have won in literature a place as high as that which he gained as a naturalist. His popular writings, all too few, are far above the average; for Mr. Hedley had a sense of style as well as abundant knowledge. Often he was urged to write a book of his wanderings, as student and collector. And, smiling, he would say it might be undertaken in the years of leisure.

As a conchologist, Mr. Hedley's fame is secure. He earned a world-wide reputation by his studies of Australian mollusca; but in recent years, his attention was devoted mainly to coral reef problems. He joined the Australian Museum staff under John Brazier, F.L.S. Upon the latter's retirement, Mr. Hedley succeeded him, as conchologist, and during the following thirty years he published very many papers, well illustrated, mostly by himself, describing new species of mollusca. He was Past-President of the Linnean Society of New South Wales, the Royal Society of N.S.W., and the Royal Zoological Society of N.S.W., Honorary Fellow of many other Australasian Societies, and a member of our Club. (He contributed to the *"Naturalist."*) He went with the Royal Society of London Expedition to examine the Funafuti Atoll, and reported on its molluscan fauna. He also reported on the mollusca collected by the British Antarctic Expedition, 1907-9, and subsequently on the mollusca obtained during the Australasian Antarctic Expedition, 1911-1914.

Mr. Hedley died at his residence, Mosman, N.S.W., on September 14th, he had been invalided from his work as Scientific Director of the Great Barrier Reef Investigations Committee, a position which he accepted after retiring from the Australian Museum, where he was Chief Keeper of the Collections. He was born at Yorkshire in 1863.

INTRODUCTION OF BRITISH BIRDS.

Blackbirds, skylarks and thrushes have become familiar birds in the Melbourne district, and the two first-mentioned in many country places. They are accepted almost as natives now, and indeed, some people may not even know that they are introduced species. Recently, Dr. G. C. Nicholson, D.D.Sc., of Melbourne, sent me some interesting notes regarding the coming of British birds to Victoria. The alien songsters of our parks and gardens, are, he states, descendants of birds that were liberated by his uncle, the late Dr. George Nicholson, of Ballarat.

"One morning in August, 1876," Dr. G. C. Nicholson writes, "my uncle took me for a drive beyond Wendouree. He told me that I would soon see some prisoners released from captivity, and my feelings were hardly enthusiastic at the information, as I was only a small boy, and at this time bushrangers were much in evidence. My uncle, however, was in great spirits as we neared the rendezvous, where two of his menservants were in charge of the 'prisoners.' There were five or six large boxes, with wire in front, containing blackbirds, thrushes, and skylarks. This was the *third* consignment of birds that my uncle was instrumental in bringing out from Britain. The first he imported at his own expense, from Ireland, in 1867. The second lot arrived in 1870 or 1871.

"The birds of the third lot, as in previous consignments, were obtained principally from County Cork. Some, however, were captured near Dublin. Dr. Stewart, of Smythesdale, a friend of my uncle, shared the expense in connection with this importation. The birds were liberated at about 11 o'clock. The day was bright and crisp, and when Dr. Stewart arrived, he give the signal and the doors were opened. It took quite a long time, nearly two hours I think, for the feathered prisoners to come out. I remember how timid they were. One little thrush could not fly at all, and had to be taken back to my uncle's aviary. There was a clump of trees nearby, but the birds kept hopping along the ground for a distance. About a quarter of a mile from this place was a large dam, called the Little Lake, surrounded by trees.

"In 1867 my uncle took home to Ireland, wallabies and magpies and some other birds, which were kept at our house at Castletown, Beechaven, County Cork, to the great discomfort of our family, so my mother told me.

Dr. Nicholson eventually gave both wallabies and birds to the Dublin Zoological Gardens. He was a great lover of birds, and when sparrows were imported he had a little cot erected near his stables to encourage them to nest."

Dr. G. C. Nicholson's uncle was an old cavalry surgeon, and in the early days was known by his army title, Surgeon-Major George Nicholson, later of the Prince of Wales' Light Horse. He guarded his bird friends, and on one occasion chased two boys who had been detected in a shangai offensive against the sparrows. Buggy whip in hand, and coatless, the doctor raced down Albert Street, Ballarat, after the lads, both of whom were to become noted citizens. One was captured and soundly whipped.—C.B.

CHECK LIST OF AUSTRALIAN BIRDS.

"The Official Checklist of the Birds of Australia" (second edition), has now been published—its preparation was begun in 1915. To every one who is interested in our avifauna, it is indispensable. The number of species recognised by the Check List Committee, is 707; but the sub-species, included as synonyms, are very numerous, and many of them are merely geographical varieties, and need not concern the field naturalist, whose views often differ widely from those of the systematist.

A most interesting and valuable appendix, by Mr. H. Wolstenholme, B.A., deals with the scientific names of our birds. Notes on the names are given, also a vocabulary, and suggested pronunciation in syllables. This section of the List may be read through with both profit and pleasure; and should a second edition of the "Census of the Plants of Victoria" be called for, a similar appendix might well be prepared, for the benefit of wild flower lovers, who may not know the meanings of scientific names.

HUMMING BIRD AND BLUE GUM FLOWERS.

Mr. P. R. H. St. John, who forwards the following excerpt from an American journal, says that he knows of no Australian bird that uses the stamens of Eucalypt blossoms as nest-material:—

"I will here speak of Allen's Humming Bird (*Selasphorus alleni*) that commenced to build its nest on a rose, under the porch, and within 8 feet of the floor, in front of our bedroom window, on May 27th. She commenced the nest on the end of the stalk, by bringing a lot of willow cotton and webs. She would place herself on the spot chosen, then with her bill, running it here and there around the edge of the bottom, picking out a bit here and there to place some other in its place, then working her wings in a fluttering manner to shape the nest around her body. On May 31st she laid her first egg, although the nest was not all done yet. . . . . Once or twice she left the nest to get a bit of web or cotton to put around the nest. On June 1st she did not lay an egg, as the wind was blowing hard all day. So she had to keep on her nest to save her egg. The nest looked about half done, a great deal of cotton from the willows and the *stamens* of the *Australian Blue Gum flowers* were used for lining the inside of the nest."—(W. O. EMERSON, *Ornithologist and Oologist*, Vol. XI., No. 3, p. 37).

SOME VICTORIAN LIZARDS.

Few additions to the List of Victorian Lizards are likely to be made, though the Mallee country and our Alpine region may yield some varieties of familiar species. The chief work to be done in this field, is not collecting, but observation of habits. We know little regarding the life histories of these attractive creatures. Begin to write a biography of any species, and you find that the material is scattered and scanty. No one, apparently, has made intensive studies in the field, of even our commonest lizards.

My own observations on lizards have been made too casually; but some species I have kept in captivity, and, watching their ways, have thought that it would be delightful to study lizards in their natural haunts, as birds are studied. More difficult it would be; but the results might be of great interest and value.

In the Mallee, at Murrayville, in October, 1925, I captured, among other species, an immature example of the Painted Dragon, *Amphibolurus pictus* (kindly identified for me by Mr. J. A. Kershaw). It was lurking under a log in a moist spot near a dam, and became lively as soon as sunlight touched it. Fawny yellow and brown, with dark markings, it was, in coloration, quite unlike the splendid figure of the species given in the *Horn Expedition Report* (Zoology, Pl. X., Fig. 1). There is much variation in the coloration of this, and many other species, but on the fringe of the "Desert," in North-Western Victoria, one might expect to find Painted Dragons gay in brick-red, yellow and blue, or showing signs of colour beauty even in youth. My captive was docile, and a photograph was obtained easily.

From Murrayville I brought home a Stump-tailed Lizard, *Trachysaurus rugosus*, and made it a tenant of the garden. It soon wandered, and was captured in a neighbour's garden. Again it disappeared, and three days later was discovered a fair distance from "home," among Mallee roots in a yard. Returned to me, it was given freedom of the suburban "estate," but within a week was missing, not to be found again. With other Stumptails, my experience has been similar; these reptiles are slow upon their ways, but wander they will, given the opportunity.

Several species of the little, metallic-coloured lizards of the genus *Liolepisma*, have been liberated in my garden; and sometimes I see one basking on the gravel, beautiful in tints of purple, brown and green. I have had them on my writing desk in the study, gliding about the polished wood, unafraid, and even friendly. They are dainty and graceful; desirable as any "queer pets" known to me.—CHARLES BARRETT.

The Victorian Naturalist

VOL. XLIII—No. 7. NOVEMBER 5, 1926. No. 515.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held on Monday evening, October 11, 1926. The President, Mr. E. E. Pescott, F.L.S., occupied the chair, and about 65 members and friends were present.

CORRESPONDENCE.

From Combined Progress Associations of Shire of Fern Tree Gully, assuring the Club of their support and co-operation in the movement towards the proclamation of the Dandenong State Forest as a National Park.

From Victorian Bush Nursing Association, notifying the election of Miss E. H. Gabriel and Messrs. Geo. Coghill and F. Pitcher, as life-members of the Association.

REPORTS.

Reports of excursions were given as follow:—Royal Park, Mr. R. E. Luher, B.A.; Mornington, Rev. G. Cox; Ringwood, Mr. F. E. Wilson; Balwyn (Maling's Quarry and "Maranoa" Garden), Mr. L. L. Hodgson. Mr. E. E. Pescott stated that the Yarra Junction excursion on October 9 had been abandoned owing to unpropitious weather.

Mr. C. Daley reported on the visit to Belgrave on September 18 to attend the Conference regarding Sherbrooke Forest, and said that the six members present were conducted through the area, and subsequently entertained at luncheon by the local Progress Association.

ELECTION OF MEMBERS.

The following were elected as ordinary members:—Miss A. F. Smith, 86 Station Street, Box Hill; Mr. Geo. Findlay, 101 Collins Street, Melbourne; Mr. A. H. Ferguson, Guarwyn Road, Murrumbeena; Mr. John Ingram, 30 Clowes Street, South Yarra; and Miss N. Moorehouse, 45 Arnold Street, South Yarra; and Mr. E. H. Hatfield, P.O. Box 22, Lilydale, and Messrs. G. P. Cleeland and F. T. Cleeland, "Nulgerong," Cannie P.O., as country members.

GENERAL.

The President stated, in regard to the Wild Flower Show, held at the St. Kilda Town Hall on October 5, that it was too early to make an announcement as to the financial result, but he wished to take the opportunity of thanking all those members and friends who had assisted in making the Show a success.

Mr. T. James moved and Mr. F. Chapman seconded, that a visit of members to "Maranoa" Garden, Balwyn, to label the native plants growing there, should be arranged at some future date.—Carried.

PAPERS.

Mr. H. B. Williamson gave a lecture, illustrated by lantern slides, descriptive of various interesting native plants which he had observed in different parts of Victoria.

EXHIBITS.

By Mrs. E. Coleman: Living specimens of *Prasophyllum Brainei*, Rogers and *Prasophyllum brevilabre*, Hook. collected by Mrs. D. J. Paton. Herbarium specimens of *Prasophyllum elatum*, R.Br., with stem 4ft. high and 42 expanded flowers and 28 buds; *Caladenia Patersonii*, var. longicauda, 3 ft. high, a two-flowered specimen with sepals over 6½ in. long, making a spread of over 13 inches (collected by Col. B. T. Goadby, Cottesloe, W.A.).

By Mr. E. E. Pescott, F.L.S.: Cultivated specimens of *Eucalyptus torquata, Hibiscus Huegelii, Clematis aristata*, var. *Dennisæ*, and *Leptospermum lanigerum*, var. *grandiflorum*—all in flower. Living specimen of *Moloch horridus*, the "Mountain Devil," from Transcontinental line.

By Mr. P. H. R. St. John: Herbarium specimen of *Bertya rotundifolia*, F. v. M. (Euphorbiaceæ), collected at Queenscliffe, February, 1886 (found in Herbarium, Melbourne Botanic Gardens). Not yet recorded as occurring in Victoria. Previously known only from Kangaroo Island.

By Mr. L. Hodgson: Cultivated specimens in flower of *Calytrix Sullivani* (Grampians Fringe-myrtle), *Hibiscus Huegelii, Pultenaea scabra* (Rough Bush-pea), *Eutaxia diffusa, Dodonaea viscosa* (Giant Hop-bush), *Grevillea asplenifolia, Grevillea aquifolium* (Prickly Grevillea), and *Chorizema cordatum*.

By Mr. F. Pitcher: Sponge collected on beach in Western Australia.

By Mr. A. C. Nilson: Several pieces of rock showing imprints of shells—found in railway cutting at Royal Park, 18/9/1926. The smell of the sea still clings to the rock.

By Mr. R. E. Luher, B.A. (for Mr. D. Orchard, Kinglake East): Specimen of Flying or Pouched Mouse.

By Mr. H. B. Williamson: Plants in illustration of his lecture.

ROYAL PARK EXCURSION.

More than a dozen members attended the excursion to Royal Park on September 18, notwithstanding the Club's two other counter attractions. On a glorious spring day the party went to the top of the rise to the east of Royal Park railway station. In the railway cutting there was seen the stratified Silurian bedrock of Melbourne, forming a major unconformity with the Kainozoic grits, gravels, sand and iron stones above it. Turning to the north-west were seen the granitic Macedon Ranges with their hyperbyssal core of Solsbergite that formed the Camel's Hump, while more to the south were clearly seen the granitic masses that now form the Anakies and the Youyangs. It was explained that being plutonic rocks these were formed in post-Silurian times in the bowels of the earth, and it was emphasised that the subsequent sculpture of the landscape had removed millions of tons of earth to have left them in their present upstanding position. The general flatness of the intervening country was explained as being due to the Tertiary outpouring of older and newer basalt that completely filled and blotted out the minor hills and valleys that had been carved. On the way to the railway cutting on the North Melbourne side of the station, river action on a small scale was closely examined. From the top of the hill the various stages of a river's life were studied. To the north were seen the steep V sides of tributary streams that were very young in age compared with the wider valley of the Moonee Ponds Creek, with its river terraces, while to the south was noted the River Yarra meandering through the wide plain near its mouth, so indicative of old age. The corelated rocks pointed out on both sides of the Moonee Ponds Creek valley brought home to members forcibly the river erosion of recent times, and make possible to conjure up the more stupendous river sculpture that through the age has carved out Victorian landscape.

After various questions had been answered, the party went into the cutting, examined closely the decomposition of the older basalt from the solid rock, and, last but by no means least, enthusiastically attacked with hammer and chisels the face of the cutting and obtained a very fair number of representative marine corals, shells and other marine fossils for which the cutting long since has earnt fame among metropolitan fossil hunters.—R.E.L.

EXCURSION TO MORNINGTON.

Favored with a glorious day the outing arranged for September 23 (Show Day holiday) was a great success. Five members of the Victorian Field Naturalists' Club arrived by the morning train and were met at the station by representatives of the Mornington Naturalists' Club. Two others who came from town by car here joined the party. A move was at once made to a spot near "Marina," on the frontage, and here lunch was disposed of. While this was in progress the leader outlined the programme for the afternoon and gave a descriptive talk on the geological features of the locality, illustrated by a small collection of specimens, and also some information regarding the orchids, mentioning specially the newly-named species, *Caladenia praecox,* a specimen of which was on exhibition.

The party, which included eleven members of the local Club, was divided into groups according to interests, those whose fancy turned to orchids scouring the bush tracks under the guidance of Mary Evans and Ivey Chitts, while those whose inclination leaned to geology took a direct line to the fossil beds where some good work was put in.

As the visiting members were experienced geologists they needed no guidance, rather they gave much valuable information to our local fossil hunters, who were reinforced later in the afternoon by the orchid hunters. Among the most interesting trophies of the afternoon were two sections of chitons, both of which were found by Mr. Cudmore, a shark's tooth (Odontaspis sp.) discovered by Mary Evans, and a very fine silica sponge (*Ecionema newberyi*) the finder being Marjorie Allison. Among the orchids the following were secured:—*Pterostylis nana, P. nutans, P. concinna, P. pedunculata, P. vittata, Caladenia latifolia, C. carnea, C. dilatata, Cyrtostylis reniformis, Acianthus exsertus.*

The Club's hand-waggon, well equipped with picks, etc., saved a lot of carrying. Special mention must be made of Mr. Cudmore's kind services with his car, which assisted most materially in the rapid transport of a number of the party, thus enabling us to take full advantage of the limited time between trains.

Afternoon tea was served at Fossil Beach, after which the Melbourne party took its departure.—George Cox.

EXCURSION TO BALWYN.

On Saturday afternoon, October 2, about 30 members and friends took part in the excursion to Balwyn, under the joint leadership of Mr. F. Chapman, A.L.S., and myself. Mr. Chapman drew attention to some of the physiographical features of the district, and pointed out the different characteristics of the soil, making special mention of the higher sand-crowned elevations such as Beckett Park Hill and the Reservoir Hill, the intervening country showing the silurian bed-rock exposed by the erosion of the Koonung and W. Creeks between Doncaster and Canterbury, respectively.

The party then proceeded to Maling's Quarry, in which an outcrop of rock showed evidence of the folding of the earth's crust at a remote age. This rock, Mr. Chapman explained, consisted of brecciated silurian, and had undergone many changes in its composition some millions of years ago. Cr. J. D. Howie, of Camberwell, here joined the party and stated that the land in which the quarry was situated had recently been presented to the Council, and it was proposed to convert it into a small park in which native trees and shrubs would be planted, while the quarry itself would be formed into a pond.

After afternoon tea had been kindly dispensed by Mr. and Mrs. Chapman, at their residence at Balwyn, a visit was paid to "Maranoa" Garden adjoining Beckett Park. This garden comprises several acres on the highest hill in the district, from which extensive views are obtained. The garden was planted some years ago by the late Mr. J. M. Watson, and has recently been taken over by the Camberwell Council. Among the many native plants in bloom were several species of Grevilleas, *Calytrix Sullivani* (Grampians Fringe-myrtle), *Eriostemon myoporoides* (Long-leaf Wax-flower), *Prostanthera rotundifolia* (Round-leaf Mint-bush), *Hibiscus Huegelii* (of W.A.), *Thryptomene calycina* (Bushy Heath-myrtle), and others.

A large number of Acacias and Eucalypts of different species also showed vigorous growth, and in addition there was a good collection of exotic trees and shrubs, several of which were in flower.

It was suggested by Cr. Howie that the Club might later organise another visit to the garden, when the opportunity could be taken of labelling the various plants for the benefit of those interested.—L. L. HODGSON.

The Wild Flower Show.

Our Annual Wild Flower Show, held for the second time at the St. Kilda Town Hall on October 5, was generally considered one of the best the Club has yet organised. The general effect was very pleasing, the arrangement of the flowers being excellent, the grouping good, and the freshness of the blooms remarkable. Perhaps the cool weather was the main cause of their generally good appearance.

The Botanic Gardens, by the courtesy of the Director, Mr. F. Rae, and thanks more particularly to Mr. St. John, staged one of the finest collections it has ever sent.

Of the 52 species exhibited, the following were the most notable: — *Anigozanthos Manglesii* (W.Aust.), *Bauera rubioides*, *Bossiæa linophylla*, *Boronia heterophylla*, *B. elatior*, *B. megastigma* (2 forms), *B. Muelleri* (Victoria), *Chamælaucium uncinatum*, *Chorizema cordatum*, *C. ilicifolium*, *Calytrix Sullivanii*, *Callistachys elliptica angustifolia*, *Dendrobium speciosum*, *Doryanthes Palmeri*, *Dracophyllum secundum*, *Dodonæa viscosa*, *v. spathulata* (in fruit), *Epacris longiflora*, *Eutaxia myrtifolia*, *Eucalyptus torquata*, *Grevillea Caleyi*, *G. Hookeriana*, *Melaleuca squamea*, *M. ericifolia*, *Kunzea parviflora*, *Prostanthera Sieberi*, *Telopea speciosissima*, *Thomasia brachystachys* (W.Aust.).

Many of the visitors were noticed recording the names of plants which especially took their fancy, and enquiring where they could be obtained for cultivation in their own gardens.

The labelling of the plants at Mr. Williamson's tables, where 248 species, not including orchids, were systematically arranged, was, seemingly, much appreciated. Miss J. Galbraith, of Tyers, staged a splendid lot of Traralgon district plants, representing nearly 150 species, including 20 species of ferns and these also were labelled throughout.

Mr. Wisewould, as has been his custom for many years, showed a good collection from Pakenham, and Mr. Audas a representative set of Frankston plants. Mr. George

Coghill set out a fine lot of the flowers characteristic of the north, at Taradale, and Dr. Sutton some from the Brisbane Ranges. Gippsland was on this occasion much better represented than in former years. From the Cann River, Mr. W. Herbert sent *Boronia Muelleri* (pinnata), a fine specimen of the epiphytal orchid, *Sarcochilus falcatus*, and the Gippsland Waratah, *Telopea oreades*. Other interesting plants were sent by Mr. T. S. Hart, of Bairnsdale, who was assisted in this collection by Mr. C. Ketels, H.T., of the Sarsfield School; Mr. Easton, who was responsible for the very fine specimens of the silvery *Helichrysum elatum*; Mr. Henderson, of Hospital Creek; the H.T. of the Bairnsdale School, Mr. T. Lees; Mr. J. E. Rickards, and Mr. R. L. Smith. Amonst the material from Sperm Whale Head were the only specimens shown of *Thryptomene Miqueliana*, sent by Mr. F. Barton, Jr.

The Grampians' flora, usually such a conspicuous feature in our Shows, was absent on this occasion. The Mallee plants, sent by Mr. F. Holt and Mrs. Freyer, of Ouyen, and Mr. and Mrs. Lougheed, of Diapur, arranged by Miss F. Smith, included the beautiful blue Halganias, some Quandongs, white everlastings, the Flame Heath, and the Urn Heath. Mr. W. D. McPhee, of St. Arnaud, also made a very nice showing of plants from his district.

The orchid table was excellent, but Mrs. Coleman, with Miss D. Coleman, and Miss Davidson, were so hard worked that it is quite evident these lovely flowers will need to be dealt with in two sections in future, keeping one for the display of a named collection and the other for sales only.

56 species, in 14 genera, were tabled, including 12 *Pterostylis*, 12 *Caladenias*, 10 *Thelymitras*, 5 *Diuris*, and 5 *Prasophyllums*, 3 *Microtis*, 2 *Lyperanthus*, and one each of *Chiloglottis*, *Caleana*, *Calochilus*, *Acianthus*, *Cyrtostylis*, *Glossodia* and *Sarcochilus*. Those who contributed to the collection were Mrs. Eaves, Miss E. Hart, Miss Davidson, Mrs. D. J. Paton, Miss Galbraith, Mrs. F. Rich, Mrs. Brooks, Mr. A. B. Braine, and Mr. H. P. Dickens.

The Western Australian table, which, as before, was in charge of Miss Fuller, assisted by Mrs. O. Pugh and Mrs. J. Murray, held the finest collection—about 100 species—we have ever had from "Swanland"; this being due, of course, to the recent visit of our members to the Perth meeting of the Australasian Association for the Advancement of Science. Many of the western plants were never before seen by Melbourne people, and their curiousness and beauty were a revelation. Perhaps the most notable were the Verticordias, the Kangaroo Paws (Anigozanthus) in red and green, yellow, orange and black, Conospermums, and the Banksias, *B. prionotes*, mandarin coloured; *B. grandis*, with its long yellow spikes, and *B. Baxteri*, with rose pink flowers.

The Queensland and South Australian tables were presided over by Mrs. V. Miller, Mrs. L. L. Hodgson, Mrs. E. Hanks, Mrs. D. Blair, Miss Keartland, Miss R. Morrison, Miss N. Moorehouse and Miss Wigan, and contained many fine things. From the northern State came *Helichrysum cassinioides*, a beautiful shrubby species with pale pink blossoms.

The display from New South Wales, which contained Waratahs, Flannel flowers, Eriostemons, amongst other good things, was in charge of Mrs. Pitcher and Mrs. Daley, ably assisted by Mrs. C. Levens and Mrs. Robinson, Miss Hughes, Miss Woinarski, Miss Josephs, and Miss Greives.

The flowers of our own State were in the care of Mrs. Edmondson, aided by Mrs. A. D. Hardy, Mrs. G. Coghill, Miss D. Nokes, Mrs. E. E. Pescott, Mrs. F. B. Sutherland, Miss Smith, Miss E. Hart and Mrs. D. J. Paton.

At the sales tables the material was both abundant and fine in colour, and all these ladies had a busy time, there being an eager demand for their stock, which included a large quantity of fern plants, brought by Mr. E. Cudmore from Pakenham.

Cultivated native plants were staged by Mr. G. Coghill, Mrs. Hill, Mr. E. E. Pescott and the students of the Burnley Horticultural Gardens, who also made a nice show of some collected in the field.

Contributions were also received from the following:—

MELBOURNE AND SOUTHERN.

Lara—Rev. A. C. F. Gates; Eltham—Mr. W. C. Tonge and pupils of H.E. School; Broadford—Mr. Hogan; Frankston—Mrs. Hall, Mrs. Daley and F. Daley; Panton Hill—Reg. Gardiner, Rudolph Fourbister; Beaconsfield—Mr. H. P. Dickens; Montrose—Miss G. Richards; Lorne—Harold "Photo"; Red Hill—Mr. G. Higgins; Mornington—Naturalists' Club, Rev. G. Cox, leader; Montmerency—Miss G. Nokes; pupils of State School; Heatherton—Mr. J. O. Reid; Brighton—Miss M. Cooper;

Belgrave—Mr. F. Pitcher; Hurstbridge—Mr. J. H. Gardiner; Airey's Inlet—Mr. W. de C. Berthou.

WESTERN DISTRICT.

Casterton—Miss N. E. Dancocks; Port Fairy—Mr. W. U. Riddell; Stawell—Mr. J. A. Hill; Dartmoor—Miss J. Jarrad.

GIPPSLAND.

Hedley—E. and L. Rossiter; Drouin—S.S. Drouin South, H.T. Mr. R. Currie; Garfield—Miss L. Dyall; Outtrim—Mr. W. Herbertson; Sperm Whale Head—Mr. F. Barton, jr.; Moe—Mr. J. A. Dower; Traralgon—Miss J. Galbraith, Mrs. Gooding, Tyers.

NORTHERN DISTRICTS.

Beechworth—Mr. A. Ladson, Mrs. Goodyear; Rushworth—Mrs. F. Rich; Strathmerton—Mr. A. Kenny; Molesworth—Miss Jeffreys; Nagambie—Mr. D. Parris; Lima East—Mrs. L. A. Stafford; Cobram—Miss O. Weatherell; Taradale—Mrs. Dorman; Maldon—Mrs. T. B. Brooks; Yapeen—Geo. Lawson and Willie Lyle; Guildford—Mrs. Tyzack; Bendigo—Messrs. Daley and Miller; Dingee—Mrs. J. Grylls; Boort—Miss McKenzie.

NEW SOUTH WALES.

Mr. J. Morrison, Denison Road, Lewisham; Mr. C. Butler, for Naturalists' Society, Sydney; Miss J. Froggatt, Croydon, N.S.W.; Mr. Chalker, Hill top, N.S.W. (purchase).

QUEENSLAND.

Mr. H. N. Slaughter, Thulimbah, near Stanthorpe, Q.

SOUTH AUSTRALIA.

Colin Jenkins, Keith, S.A.; S.A. Field Naturalists' Society.

WEST AUSTRALIA.

Mr. E. L. Haynes, Kelmscott; Mr. T. H. Blake, Mt. Lawley; Mr. R. Perry, Pemberton; F.N. Club, Perth; Congregational Manse, Busselton; Mr. Walter Exley, Victoria Park, Perth; Mr. O. H. Sargent, Perth; Miss Nancy Morgan, Claremont, Perth; Mr. Geo. Buchanan, c/o. Elder Smith, Mullewa; Mrs. C. Paterson, Mt. Magnet; Mr. J. S. Ding, per Mr. J. W. Audas, Merredin; Miss Winnie Dedman, Mrs. S. Furphy and Mr. E. E. Pescott.

The microscope section was in the hands of Mr. C. A. Lambert and many interesting slides were shown and explained by him and Messrs. S. Butler, F. Chapman, J. Eaton, R. V. Gray, T. J. James, E. A. Saxton, A. L. Scott, J. Stickland, J. M. Wilson, J. Wilcox, and Dr. R. M. Wishart.

The Bookstall and Information Bureau were in the care of Mr. C. Daley, and Miss N. Thresher had the custody of Miss Fuller's flower pictures, which attracted a great deal of attention.

All those above-mentioned helped greatly towards the success of the Show, but the real heat and burden of the day were borne by a few others, more particularly by Mr. F. Pitcher, who again directed affairs, and who had previously done much work in the way of advertising and organising the event, by Miss Gabriel, who, assisted by Mrs. F. Chapman and Miss Cruikshank, undertook the irksome duty of providing refreshments, by Mr. V. Miller, who was a host in himself, and was responsible for the erection of trestles, their dismantling, and much other valuable work both before and during the Show; by Mr. Hughes, who received and opened all the packages; and by our Honorary Secretary and Honorary Treasurer, Messrs. L. L. Hodgson and A. G. Hooke, whose services were too obvious to need special mention. Mr. Keep most kindly placed a motor lorry and driver at the disposal of the Club for the carriage of parcels.

NOTES ON TWO MALLEE WASPS.

In the Mallee, during the summer, when flies are a torment to man and his domestic animals, few insects are more welcome than the friendly policeman fly (*Sericophorus relucens*). Half a dozen of these small wasps will soon "arrest" and carry off the annoying flies. It was several years before I discovered a burrow of *S. relucens*, and at first, from the appearance of the earth around the hole, I thought it possible that the wasp made use of a beetle's burrow. On closer acquaintance I found that the excavating was the unaided work of *Sericophorus*. A damp situation is chosen for the site, and until the burrow has reached a certain depth, the wasp flies into the air and flicks each pellet of earth into space. Later, the earth is pushed up from below, and falls around the burrow in a manner similar to that of certain burrowing beetles.

Last season I was interested in the habits of a small wasp—*Pompilius nubilipennis*. Like many species of wasps, her habit is to leave her game on the threshold of the burrow and then make a final inspection below. I had removed her spider half-a-dozen times, without causing a variation in this peculiar action, and on the last occasion some ants had located the prize. The wasp attacked the ants savagely, and then quickly hauled the spider away. At some distance from the place, and in the open, she stung the paralised creature viciously in several places, then chewed off a front leg, mutilated a back leg, and after sucking at the juices for a brief period, deliberately abandoned the victim. For some time I watched her on the hunt, with wings flick, flicking, as she worked over the ground, but she made no attempt to return to the object of her wrath.—L.G.C.

The Orchids of Victoria

BY EDWARD E. PESCOTT, F.L.S., F.R.H.S.

PART III.

3. MICROTIS, R.Br.

(Small eared.)

Flowers, in Victorian species, green; small, numerous, in a terminal spike. Dorsal sepal broad, erect, hooded over the column, thus being concave. Labellum sessile, obtuse, truncate or emariginate, oblong, ovate, or orbicular. Column short and wide.

Terrestrial glabrous herbs, bearing small tubers. Leaf solitary, terete, opened out near the stem, and continued in a close sheaf down the stem.

The genus extends to New Zealand, and also to New Caledonia, Java, Formosa, Philippines, Japan and Southern China. There are nine Australian species, seven of which are endemic. The genus reaches its highest expression in West Australia, where eight species are recorded. Four species are recorded for Victoria. The genus is readily recognised by its small green flowers, closely compacted on the stems.

1. M. PORRIFOLIA, Spreng. (Leek-leaved). "Common Leek Orchid."

Labellum *emarginate* at tip: two well defined callosities at the base and one near the tip. Dorsal sepal erect, hooded, broadly ovate. Lateral sepals shorter, spreading, recurved, oblong, somewhat blunt. Petals oblong, erect. Labellum sessile, *oblong, with crisped or irregular margins;* tip blunt; lamina with two raised lines and a central one.

A common species, of variable habit from 2 to 12 inches, generally robust. Leaf usually longer than the spike of small green flowers. Flowers usually dense, but occasionally distant.

This is one of the few orchids that survive cultivation for a few years, being occasionally found among crops and in cultivated plots.

Recorded from all districts, and all States. This species also extends to New Zealand.

2. M. PARVIFLORA, R.Br (small-flowered). "Slender Leek Orchid.

Labellum *entire.* Two well-defined callosities at base, *none at tip;* oblong, ovate-oblong or ovate, partly hidden by the dorsal sepal. Tip of labellum rounded or sometimes rectangular; *margins entire and quite smooth.*

Usually a more slender species than the former, and often mistaken for it. The leaf again exceeds the green flower spike; and the plant is variable, being from 3 to 24 inches in height. The form and shape of the labellum, the difference in margins, as well as the absence of the callosity at the tip, form the principal differentiations between the two species.

Mr. Oakes Ames, the well known American orchid authority, some years ago united the two former species under the species, *M. uniflora,* Reichb. f. That was nearly thirty years ago. As the British Museum authorities do not to-day accept that view, and as the differences between the two plants are quite distinct, it is well to retain the two species.

3. M. OBLONGA, Rogers. (Oblong-labellum.) "Oblong lipped Leek Orchid."

Labellum reflexed, *narrow oblong,* margins crenulate, with two large callosities at the base and one near the apex. Column stout and short. Dorsal sepal erect, narrowly hooded. Lateral sepals revolute. Lateral petals erect, obtuse or truncate, linear falcate.

A quite slender plant, varying from a few inches to 3 feet in height. Flowers quite small, distant, on short pedicels. Leaf long and usually exceeding the flower spike.

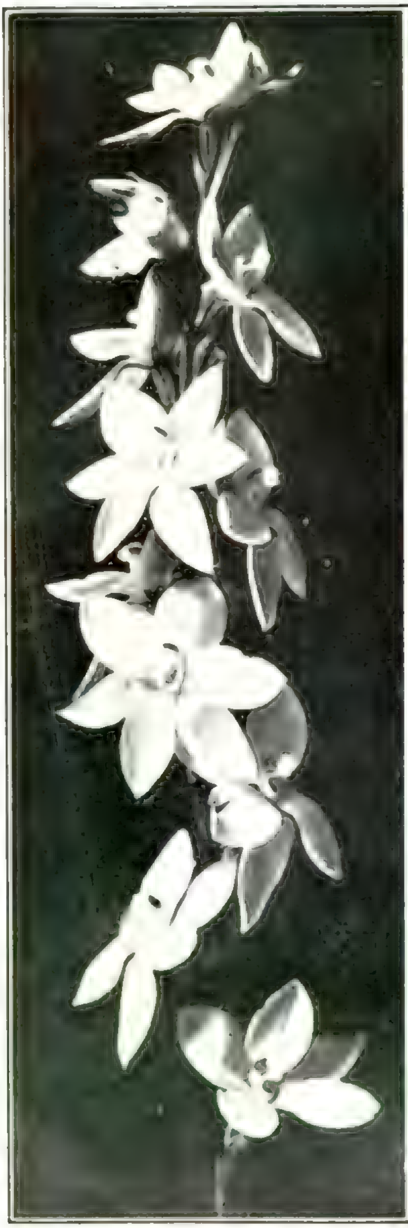
The species has long been confused with *M. porrifolia.* It is more of a hill or mountain plant, much more slender in habit, and flowering later, from November to January. In some seasons, the plants seem to rest, for occasionally quite few plants are seen, where usually there are many.

It is readily recognised from its oblong labellum with a crenated margin, and by the presence of the callus near the apex of the labellum.

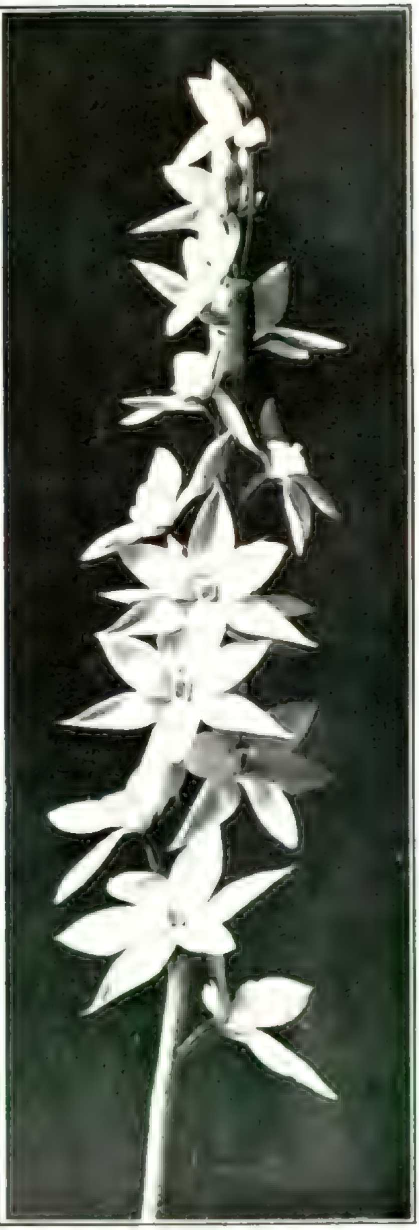
Recorded from the N.E., S.W., and S. Common at Sherbrooke Gully; found also in South Australia. Recently I found a number of plants growing several feet high on tree ferns, which were definitely orchid plants, and which, although not in flower, could almost with certainty be determined as Microtis. From the locality —Sherbrooke Gully—it would almost be certain that these would be plants of *M. oblonga.*

4. M. ATRATA, Lindley. (blackened—the plants when dried.) "Swamp Leek Orchid." Labellum oblong or

PLATE IX.



THELYMITRA LONGIFOLIA
(R. & G. Forst.)
Common Sun Orchid.



THELYMITRA ARISTATA
(Lindl.)
Scented Sun Orchid

almost square; tip quite blunt, margins entire. Lateral sepals oblong, blunt, not recurved. Petals shorter, and spreading.

A very small, almost tiny species, from 1 to 3 inches high, often only 1 inch. Leaf far exceeding in length the flower spike. Flowers and leaf of a uniform pale green colour, flowers very minute.

Usually found in wet or swampy places, often growing almost submerged. I have seen it in the Wartook (Grampians), Reservoir, growing at the edge in many thousands. The whole plant blackens when dried. Flowers in September and October. Recorded for S.W., and S.; and also from Tasmania, South Australia, and West Australia.

4. PRASOPHYLLUM, R.Br.

"Leek leaf."

Flowers reversed, Dorsal sepal lanceolate or broad, concave, sometimes arched, often recurved. Lateral sepals sometimes free, sometimes united (connate). Petals usually shorter than the sepals, lanceolate or linear. Labellum sessile or attached by short claw to base of column; undivided. the margins crisped, denticulate, ciliate (hairy) or entire: the surface having a longitudinal central callus. Column very short, not winged, with two lateral erect appendages.

Terrestrial glabrous herbs with globular, or ovoid tubers. Leaf solitary, usually terete, often sheathing the base of the stem, and very much reduced in the smaller species, often quite dry at time of flowering. Flowers several or many on a terminal spike, green or greenish, white, lavender, yellow or purple and occasionally fragrant.

About 60 species are known, 58 of which are recorded for Australia, 23 species are recorded each for Victoria and New South Wales, while only 7 are known in Queensland. The genus is therefore more temperate than tropic. Four species are found in New Zealand.

The genus is admitted on all sides to be one of the most difficult of determination. The flowers are so small, the species often so much resemble each other, and there appear to be so many intermediate forms, that recognition is very difficult. Even where standard features are laid down, these are not at all constant. Thus the cohesion or union of the lateral sepals is usually considered to be a specific consideration, but even this is not permanent. In over one hundred flowers of P. brevilabre collected from many spikes found at Healesville, it was noted that nearly half were not united in the sepals.

The genus is distinguished from all others by having the *flowers reversed*, or placed upside down on the spike: thus the labellum points upwards instead of downwards.

The species vary considerably in height: P. elatum, our tallest species is often 3 or 4 feet high, while P. despectans, one of the smallest species, is found only 2 inches high.

Prasophylla are to be collected for many months in the year. The smaller species flower in autumn, and the taller and more robust in spring and summer. A few flowers are also to be collected in winter.

1. P. AUSTRALE, R.Br. (Southern.) "Austral Leek Orchid."

Leaf fully developed at flowering time; plant from 1 to 3 feet in height, lateral sepals usually connate; flowers sessile, ovary slender, green and white in colour; sepals and petals all acute; the dorsal being erect, sometimes recurved; labellum white, sessile, reflexed about the middle, often acutely; the end crisped, with undulate margins; the callous portion ending in two rounded knobs or plates.

This is an early summer flowering species, conspicuous for its white labellum, and its slender ovary or seed vessel. The flowers are not very distant on the spike; the leaf is usually quite long, and the flowers are often sweetly scented. It is found in all of the States, and has been recorded from all parts of Victoria except the N.E.

2. P. FRENCHII, F.S.M. (after George French). "Stout Leek Orchid."

Leaf not always as tall as the flower; flower dark purplish, or purplish green; flowers slender; sepals and petals usually narrow-lanceolate, but sometimes lanceolar ovate; labellum somewhat cuneate-orbicular, incurved; the terminal end almost deltoid, membranous and only slightly crisped.

This is not always "stout" as the vernacular name implies, frequently it is quite a dainty and slender species, with slender flowers. The purplish color of the whole flower distinguishes it from all other species.

It is interesting to note that this orchid was found by two collectors on the same day. Mr. George French found it near the Dandenong Ranges, and Mr. F. G. A. Barnard at Tooradin. Mr. French was an officer of the

National Herbarium, under Baron von Mueller, and so took his new find to the Baron on the Monday morning. The Baron at once named it in his honour. A few hours later Mr. Barnard brought along his "new orchid," only to find that he had been just forestalled by Mr. French.

Recorded only from Victoria, and there only from the S. and N.E.

3. P. TADGELLIANUM, Rogers (after A. J. Tadgell). "Bogong Leek Orchid." Plant short and stout, leaf exceeding the stem; flowers 8 to 12, greenish and yellow with chocolate markings; dorsal sepal widely lanceolate; lateral sepals connate to the middle. Labellum sessile, lower half almost orbicular erect against the column, then recurved, narrow and cuneate beyond the bend; callous part widely triangular at the base, prominently raised; membranous part narrow throughout.

This plant was formerly classed as a variety of *P. Frenchii.* The labellum is not laterally contracted as in that species. It is purely an alpine plant found only at Mt. Kosciusco, and on the Victorian Alps. Never collected below 5,750 feet.

See "Victorian Naturalist," April, 1924, for illustration.

4. P. FLAVUM, R.Br. (yellow). "Yellow Leek Orchid." *Stem stout,* sometimes two feet in height; leaf very short, one inch or more only in length, otherwise the plant is leafless; flower, *greenish yellow,* often yellow, stem brown; ovary elongated; sepals acute, lanceolate; lateral sepals connate; labellum sessile, gradually recurved, inner plate not very prominent; lateral appendages to column short, broad, and is lobed at the end. Flowers numerous; roots fleshy, thick and tuberous.

This yellow, strong stemmed species is quite rare in this State. It has been found at Belgrave, Grampians, Baw Baws, and Cravensville. In each case only a few specimens have been found. The thick, fleshy, tuberous roots somewhat resemble those of *Dipodium punctatum.*

It must not be confused with the yellow or yellowish form of the following species. The almost absence of the leaf and the gradual recurving of the labellum, distinguishes this species from *P. elatum.*

Flowers in December, January. Recorded also from New South Wales and Tasmania.

5. P. ELATUM, R.Br. (tall). "Tall Leek Orchid." A robust species, quite the tallest in this State, growing from two to four feet in height. Leaf long, often exceeding the spike. Spike many flowered, flowers fairly

large, varying from pale green, yellowish green, purple to purplish black. Lateral sepals connate almost throughout. Dorsal sepal lanceolate, petals, somewhat narrower. Labellum sessile, ovate, recurved from near the middle; margin in front somewhat membranous and corrugated, or crisped.

This tall species is sometimes common in moor or heath lands along the coast, and as well inland. The colour variations grow freely intermingled, and the yellow form has more than once been recorded as the preceding species. It is reputed to flower quite freely after a fire has passed over its habitat.

Recorded from all districts but the N.E., and also from all other States except Queensland. Flowers in October and November.

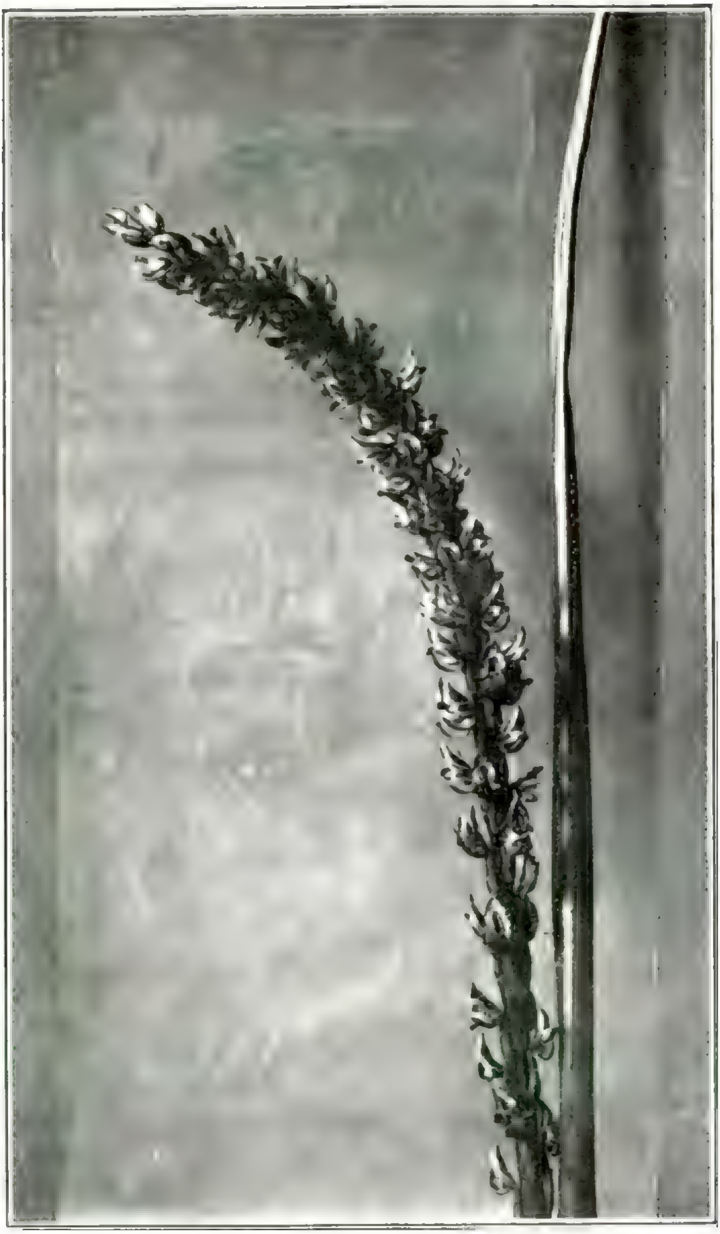
6. P. GRACILE, Rogers (slender). "Slender Leek Orchid." Usually a slender species, upwards of nine inches high. Leaf short; flowers yellowish green, rarely purple, arranged in a free loose spike; petals linear lanceolate, with incurved tips. Labellum on a well marked claw, erect part deeply concave with entire margins; the part in front of the bend narrow, triangular, sharp pointed, margins slightly undulate; membranous part white and glandular.

This is one of our very rare species, and has only been recorded from the Grampians and from Ringwood, collected possibly once from each locality. It is a South Australian species and flowers in October and November.

7. P. ODORATUM, Rogers (fragrant). "Sweet Leek Orchid." Usually a tall plant of a foot or 18 inches high, not always robust in this State. Leaf generally exceeding the spike. Flowers not small, varying in colours and shades of pink, heliotrope, and also white, very sweetly fragrant. Dorsal sepal long, incurved at first and finally recurved; lateral sepals pointed and widely divergent. Labellum clear white, sessile, reflexed from the middle, tip well turned back; erect part bulging with entire margins; reflexed part with wavy crenulate margins, bluntly triangular callous plate not thick, but quite prominent, the membranous portion exceeding the callus.

Var. *album*, Rogers (white). "White Leek Orchid." This is a smaller plant, with small white flowers, not often pale pink. In Victoria it is sweetly scented, but in South Australia it is recorded as not fragrant. The labellum is not reflexed so accurately, and the reflexed part is generally shorter than the erect part.

PLATE X.



PRASOPHYLLUM ELATUM, R.Br.
Tall Leek Orchid

Both of these plants flower in October and November, and are only recorded from the S. and S.W. The variety *album* is fairly abundant at Ringwood.

8. P. BREVILABRE, Hk.f. (shortened). "Short lipped Leek Orchid." Usually a robust plant, up to 12 inches high; leaf as long or longer than the spike; ovary short and somewhat oblong. Flowers up to 12-18, well spaced on the stem, dark brown, purplish or dark red, and white; dorsal sepals usually united, but just as often free, variable in this respect; labellum closely reflexed at centre, erect part narrow, the margins undulate; the central part, prominent and broad, and terminating about the reflexed part. Lateral lobes entire and having a prominent gland near the base of the margin.

This species has been recorded from all parts of the State except the N.W. It is often abundant in hill and forest country, particularly so in some places around Healesville. Recorded also from Queensland, New South Wales and Tasmania.

9. P. PATENS, R.Br. (spreading). "Pale Leek Orchid." A slender plant up to 18 inches to 2 feet in height, the length of the leaf very variable. Flowers well spaced on the spike, the perianth segments being well spread apart, flowers yellowish green or brown, dorsal sepal often recurved, lateral sepals free and often bidentate (two-toothed). Petals linear, usually blunt, white, sometimes pale pink, incurved. Labellum sessile, ovate-lanceolate, as long as the petals; reflexed erect portion not broad; margins white, undulate well defined, inner plate not very prominent. Lateral appendages narrow oblong, with blunt tips and rounded basal lobe.

This species is recorded from every section of the State. Its conspicuous labellum, together with the spreading perianth segments mark it out clearly. It flowers from September to November, and is also recorded from Queensland, New South Wales, South Australia, and Tasmania.

The variety *pruinosum*, Rogers, from South Australia, is prune coloured, having a long basal lobe to its lateral appendages.

10. P. COLEMANAE, Rogers (after Mrs. Coleman and her daughters). "Lilac Leek Orchid." A moderately stout plant, often 18 inches high, carrying a rather loose spike of about 21 *lavender or lilac* flowers. Dorsal sepal greenish, the conical point recurved or erect. Lateral sepals green, *fluted, spreading*, very divergent. *Petals*

lavender, with a narrow green central stripe, spreading. Labellum *lavender*, margins crenated, widely ovate, nearly sessile. Column short; lateral appendages oblong falcate and lavender tinted. Anther purplish.

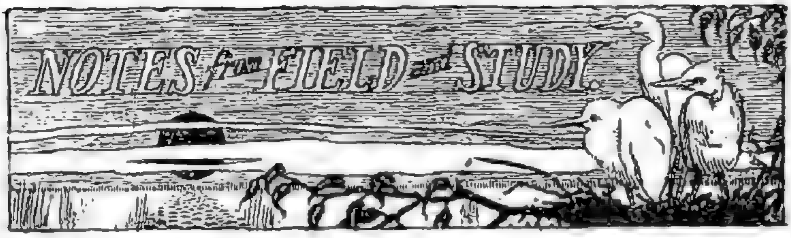
The "Lilac Leek Orchid" has so far, only been collected at Bayswater, where it was found by its namesake in 1922. See "Victorian Naturalist," August, 1926, for illustration.

11. P. FUSCUM, R.Br. (dusky). "Tawny Leaf Orchid." A plant of medium size, up to one foot or more in height. Flowers many on spike, somewhat small, standing out well from stem, often tawny or dusky brown in colour, but also bright green. Sweetly fragrant. Dorsal sepal long, ovate-lanceolate, generally erect; lateral sepals free, usually with cylindrical bidentate points. Petals erect and bluntly linear. Labellum, erect part concave or bulging with entire margins, recurved part acute with crisped margins; inner or callous plate not very distinct at base, occupying a large part, increasing in thickness, and reaching nearly to the tip. Lateral appendages wide and blunt, almost oblong.

This is a decorative and dainty species, often found growing under hard open conditions. The fragrance is constant, both in the dusky and green forms, which are quite distinct in colour. Flowers in spring; recorded from all parts; and also from Queensland, New South Wales, South Australia and Tasmania.

12. P. BRAINEI, Rogers (after A. B. Braine). "Green Leek Orchid." A slender plant, about a foot high; flowers green, with a narrow leaf about as long as the spike. Flowers almost sessile; ovary long and obovate. Floral segments all glandular. Dorsal sepal erect or recurved, ovate lanceolate, slightly contracted at base. Lateral sepals free, somewhat divergent. Lateral petals erect, narrow linear oblong. Labellum sessile, margins entire until beyond the middle, then recurved and reflexed, margins crenulate and *very shortly ciliate* from the bend to the tip. Callous portion dark green, *margins shortly ciliate;* membranous part wide and somewhat white. Lateral appendages rather large, broadly oblong with blunt oblique tips.

This species is casually distinguished from the green form of P. fuscum, by the dark green of the labellum, and the ciliate hairs referred to above. It has only been found growing among *Juncus* at Ringwood, where it was collected by the author and C. French, Jr. It flowers in October.


NOTES from FIELD and STUDY.

ORCHIDS AT THE NATIONAL PARK

A party of four (Dr. and Mrs. R. S. Rogers, of Adelaide, my daughter and myself), spent an interesting week at the National Park, Wilson's Promontory, early in September.

Our chief object was of course to search for interesting orchids, though we were prepared to accept gratefully whatever natural history interests the Promontory might provide for us; and we were not disappointed.

From the nature and situation of the National Park these interests are necessarily many and varied, for the country consists of hills and gullies, gentle rises or hollows covered with heath and other wild flowers, one of the most abundant being our beautiful red Correa. There are rocky coasts, delightful sandy bays, or quaint islands where many sea birds find resting places; and there are sedge-covered swamps or tea-tree fringed river flats, yielding a rich harvest for all—botanist, zoologist, geologist, or the student of marine life; and he would be hard to please who could leave the Park without a host of delightful memories and a few treasures for his museum or his herbarium.

The journeys to and from the Park are not the least delightful of our recollections, while our week was crowded with interests. The briefness of the holiday allowed us only partly to measure the wealth of natural treasures the Park provides.

We were a little too early for most of the spring orchids, though, had we gone later we might have missed two species that were of especial interest.

Of pterostyles we collected 11 species, including two probable hybrids and one that we thought new. It appeared at first to be a hybrid—*P. alpina* x *P. pedunculata,* but has since been found at Healesville. Its claims to specific distinction are now under consideration.

Cyrtostylis reniformis was abundant—very many one-flowered specimens being noted. There were fine flowers of *Acianthus caudatus*, among them two entirely green specimens.

Among thosands of corysanthes leaves we found only two or three flowers of *C. pruinosa* and seeded flowers of *C. unguiculata*.

It was early for the species of diuris, which were just commencing their season, also for thelymitras, which, with the exception of *T. antennifera*, were mostly immature.

Of the caladenias, only *C. latifolia* was abundant—two and three flowered specimens being numerous. Of the others, except in bud, we found none in large numbers.

Altogether we collected 33 species.—MRS. COLEMAN.

FLYING OR POUCHED MOUSE

Flying or Pouched Mice are found in central Victoria along mountain creeks. They are very rare, and live in small colonies in the hollows of trees during the daytime. They come out to feed at night and by no means are easily caught. Tree fellers for saw mills are the people who mostly find them in bringing down some giant tree having a dry hollow somewhere in its side. Domestic cats also bring them to the country home occasionally, just as they bring in the ordinary mice in the cities. I have received several specimens in that way. When the cats have kittens to feed they usually bring these flying mice home alive for the kittens to play with before killing and eating them. These interesting little animals are the smallest of the Australian marsupials and look quite as handsome as the larger species, especially when one has a young one looking out of the pouch. Then they look the prettiest of our native animals. In reality they are a pigmy flying squirrel or phalanger, to which order they belong.

The specimen shown was caught by the household's cat and brought home alive, but it soon afterwards died. It is thus apparent that our domestic cats in the bush destroy quite a lot of our native animals as well as our native birds, and these latter in no small numbers through the year, especially the harmonious Thrush which the cold of winter compels to come around our doors in the bush eagerly looking for a few crumbs.—DAVID ORCHARD, Kinglake East.

FRIENDLY WATTLE BIRDS.

I have generally believed the Wattle bird to be rather shy until this season. All this year a pair of these birds have remained in our garden, and lately have been energetically climbing up the standard and other roses, eating off the blight. They have built their nest and are now rearing a brood in a pittosporum tree opposite my dining room window, the branches of which touch the verandah, 6 ft. wide. Some one is nearly always in the room, and as the window is mostly open they can be easily seen a few feet away; moreover at night our blind is seldom down, the lamp light shines directly on the tree. On the verandah one can be on the lounge with the birds flying in and out feeding their young a few feet overhead. Perhaps this is not unusual, but I have not known it to occur before.

We also have this year again nesting with us, the Magpies, Magpie Larks and Butcher birds. The bush fires in January drove the Coach-whip birds from our gullies, but during the last three weeks they are back again, just below the house.—F. WISEWOULD, Pakenham Upper.

BITTERN IN CAPTIVITY.

Rarely, if ever, is the booming called of the Bittern, *Botaurus poiciloptilus*, heard near Melbourne, where its former haunts in reedy swamps and marshland are hardly remembered now. But a fine example of this curious bird is thriving in the Zoological Gardens. It has taken more kindly to captivity than any of its predecessors domiciled in the Gardens. In the wild state. Bitterns prey chiefly upon frogs, small fishes, and aquatic insects; the bird at the Zoo, Mr. Andrew Wilkie tells me, catches sparrows, and swallows them whole!

It is interesting to watch the Bittern at bay. Facing the intruder, it crouches, half opens its wings, puffs out its plumage—especially the neck-feathers, and slants its beak upwards, almost as a bayonet is pointed by a soldier, prepared to receive a charging foe.—C.B.

HON. LIBRARIAN'S NOTE.

The Hon. Librarian has in stock, and available to members, "The Southern Science Record," Vol. I., Nos. 1-13, of which three sets can be supplied at 9/- each. and odd parts in addition; Vol. II., Nos. 1-12, one volume at 12/-, and odd parts, 1-10, at 1/- each. Members are reminded that back volumes of the "Naturalist" can be obtained at from 3/- per volume (Vol. xi.-xviii. inclusive, and some others) upwards; and that they should not neglect the present opportunity of completing their sets at a reasonable figure.

The Hon. Librarian would be glad to obtain copies of the "Victorian Naturalist," for July, 1885, January, 1886, June, July and August, 1887, and April, 1917, so that complete sets can be made up in the future. A good price will be given for these.

LIFE HISTORIES OF *MILETUS* BUTTERFLIES.

By C. H. Borch.

Butterflies of the genus *Miletus* are noted for the brilliant coloration of the undersides of their wings; and *M. apollo*, the largest species found in Australia, is a regal insect; while *M. narcissus* is a little gem. When collecting with Mr. A. Burns, in the Cairns district, N. Queensland, last summer, I obtained larvae and pupae of both these species, and learned something of the life histories.

Larvae of *M. apollo* were found feeding in the bulb of an epiphyte—not an orchid, but a lily—while pupae also were sheltering in the plant. Each of the lily bulbs, growing on tree trunks, was honeycombed with tunnels made by small black ants, and when opened had the appearance of a sponge.

Searching for butterfly larvae was no pleasant pursuit. One of us would climb the tree, while the other remained below ready to catch plants as they dropped. The first vibration of the tree-trunk—often that of a sapling—brought the ants from their citadel in battalions. They swarmed over the butterfly hunter's wrists as the lily plant was siezed by him, and dropped on to his neck and his back. The climber, on descending, had to stamp and jump, and slap vigorously to free himself of angry ants. Then the bulbs were cut open, and searched for the rewards of "raiding."

The larvae of *M. apollo* are of a dirty white color, rather rounded, and nearly or quite naked. They are sluggish, and shelter in the ant-tunnels, eating the walls of a slowly enlarging cavity, in which they pupate. Some of the older bulbs we examined, were little more than shells—having been eaten out by generations of butterfly larvae. The pupae are reddish, and semi-transparent, the wing-cases being visible in glowing red when the insects are ready for emergence.

A larvae of *apollo* we obtained pupated on January 25th, and a male butterfly emerged on February 12th, the pupal period being 18 days. It is remarkable that in travelling through the tunnels in the lily bulb, these butterflies do not injure their delicate wings. Apparently, immediately on emergence from the pupa case, they crawl towards the light; development of the wings being checked until the insects are out in the open.

Larvae of *M. narcissus* also were obtained on a lily plant in the same locality, seven miles from the coast, as that favored by *M. apollo*. They were much flatter, rather darker, and more hairy than the caterpillars of our moonlight Blue, *M. delicia*, found at Springvale. It was not ascertained definitely, whether they were eating the leaves or the bulbs of the lily, probably the latter. Pupae were found amid the little mass of roots between the epiphyte and the tree-trunk.

Until we discovered *M. narcissus* breeding so far from the coast, I had deemed it a mangrove feeder, like *apelles*, of the mud-flats. A trip to the Cairns Inlet, at Woru, seemed to confirm this, as the insect was obtained there on the wing, or settling on the mangroves. However, we afterwards found the lilies growing quite close to the spot. We kept a bright look out for crocodiles, as it was a quiet lonely spot, said to be frequented by these reptiles. We had to search close to the water's edge, but we did not see a crocodile.

MORNINGTON NATURALISTS' CLUB.

Our Club has now entered on its third year of work, and though there has been a slight falling off in numbers, that is more than compensated for by the increase in interest in those who remain.

This season some of our girls have concentrated on orchids, and one member—Mary Evans—has located no less than 17 species within two miles of Mornington. All our specimens have been submitted to Mr. W. H. Nichols, who has kindly identified them for us, as well as ensuring a verification of records.

The species recorded for this season so far are:—*Pterostylis concinna, P. nutans, P. pedunculata, P. vittata, P. nana, Caladenia latifolia* (pronounced by Mr. Nichols a very fine specimen), *C. carnea, C. dilatata, C. deformis*, and the newly named species, *C. præcox, Diuris palustris, D. longifolia, D. pedunculata, Corybas (Corysanthes) pruinosa, Acianthus exsertus, A. caudatus* (found by Nancy Jenkins), *Cyrtostylis reniformis, Thelymitra antennifera, T. pauciflora, Glossodia major.*

Concerning *Caladenia præcox*, this was found by Myra Sonnenberg just too late for inclusion in Mr. Nichol's description in August issue of the "Naturalist." In acknowledging its receipt he thus describes it—"The finest specimen I have seen, usually 1 or 2 flowers, yours is tri-flowered, a very tall and noble specimen." Mornington is a new district for this species.

Our membership now stands at 33, including three corresponding members. This is a new departure whereby young people living at a distance may join, such corresponding regularly with our resident members in turn and carrying on a systematic exchange of specimens through the leader for the Club's collection. Our corresponding members are as far apart as Queensland, Tasmania and Gippsland.—George Cox, Leader.

BLUE WRENS IN MELBOURNE GARDENS.

Writing on Blue Wrens in the "Naturalist" of August last, D. Dickison says—"few, if any of the males lose their bright plumage during winter." My experience is of nine pairs of birds about the Treasury and the Fitzroy Gardens, Melbourne, some of which have been observed for three years. Seven of the nine males went out of colour last winter. Two appeared to keep their blue plumage all the year. Three that I have watched for three winters were out of colour this year. All are very careful to keep to their own particular localities. If one crossed a path into another's flower bed, it was at once chased out by one or other of the pair occupying it. One pair, behind the Treasury, has its domain separated by quite an imaginary line from that of the neighbouring pair a few yards away. This exclusiveness is, however departed from about June, when the parent birds take the young ones out to get rid of them to would-be partners. Not all are disposed of thus, and those not mated feed the second and third broods willingly, and some even stay with their parents for three years, though in full colour.

The greatest fear the Blue Wrens have is of the White-naped Honeyeaters (*Ptilotis penicillata*) swooping down on them, and if feeding in the open they watch carefully for these assaults. On windy days, too, the noise seems to prevent them ever leaving the shelter of the bushes.

These Wrens are all known birds that come when called, to eat egg or cake, and call out complainingly if we pass without feeding them. They are as follow:—

1. The Treasury pair which has been reported to have nested near here each season for four years. The male does not change colour in the winter.
2. The pair in the old Scotch College garden. The male is from No. 3, where he fed the young ones for three years, although in colour.
3. The very tame pair at the arch in the Treasury Gardens in Lansdowne Street. These are so tame that they feed out of our hands. Last year a bough fell on the archway while they were nesting. In consequence they tried to nest in the rubbish below, but were driven out and returned to the arch. They come many yards to meet us when called.
4. The pair in the left hand bed in the Fitzroy Gardens. The female, who is white-eyed, is from No. 3. She wandered over to the left, where she mated with a lone male. They then frequented the gully for a time, but finally returned, and are now (September) nesting in the pine tree.
5. The pair on the right hand side of the path in the small cypress. Last year they built in a palm. The cock, specially, fed the young ones. This year they have already hatched out. A different pair built in the same place before, but were disturbed.
6. The pair in the rubbish tip beside the gully. The female is an albino. These have a very wide range.
7. The pair in the hedge round the gardener's house. This male has two white shoulders. The female comes from as far as 100 yards to meet us.
8. The pair nesting just outside the work-shop.
9. A white-eyed female and her mate living just behind No. 1.

—G. HORNE.

The Victorian Naturalist

VOL. XLIII.—No. 8. DECEMBER 7, 1926. No. 516.

FIELD NATURALISTS' CLUB OF VICTORIA

The ordinary monthly meeting of the Club was held on Monday evening, November 8, 1926. Mr. P. R. H. St. John, Vice-President, occupied the chair, and about 70 members and friends were present.

The Chairman extended a hearty welcome to Miss R. S. Chisholm, who had recently returned from Canada, after an absence of two years. Miss Chisholm briefly responded.

CORRESPONDENCE.

From Town Planning Association of Victoria, inviting members of the Club to join the Association.

REPORTS.

Reports of Excursions were given as follow:—Frankston, Mr. J. W. Audas, F.L.S.; Eltham, Mr. W. C. Tonge; Geelong, Mr. C. Daley, B.A., F.L.S.; Hurstbridge, Mr. A. J. Tadgell; and Tooradin, Mr. H. B. Williamson, F.L.S.

ELECTION OF MEMBERS.

The following were elected as ordinary members:—Miss P. H. Patterson, Yarra Grove, Hawthorn; Miss W. Watsford, Yarra Grove, Hawthorn; Mr. A. A. Carter, Threadneedle-street, Balwyn; Mrs. R. Virgoe, Alexandra Club, Melbourne; Mr. E. J. D. Shew, Malin-street, Kew; Mr. J. E. Dowdle, Holyrood-street, Hampton; Misses Jessie and B. S. Thomson, Power-street, Hawthorn; Miss Wigan, 15 Lambeth-road, Toorak; Dr. D. Rosenberg, 343 Church-street, Richmond; Mr. Robt. O'Brien, State School, North Brunswick; and Dr. J. Kenneth Clark, 156 Collins-street, Melbourne. As Country Members:—Mr. Fred. A. Wallace, Glenalladale, via Fernbank; and Mr. C. E. Clayden, Sumner, N.Z. As Associate Members:—Master John I. Tonge, 804 Malvern-road, Armadale; and Master Roy Lyndon, 23 Rose-street, Armadale.

GENERAL.

The Hon. Secretary announced that the profit from the recent Wildflower Show at St. Kilda Town Hall was expected to be approximately £110, and that the Committee, after due consideration of the Club's financial requirements, had decided to donate the sum of £25 to the Children's Hospital.

Mr. D. Dickison suggested that the Club take action in regard to the proposal to have an area of land at

Ashburton declared a sanctuary. The matter was referred to the Committee.

PAPERS.

The evening was devoted to papers on Western Australia as follows:—

"Perth's Wonderland—King's Park," by Mr. J. W. Audas, F.L.S. The paper was illustrated by a series of lantern slides.

"Forest and Sand-Plain," by Mr. C. Daley, B.A., F.L.S., The author dealt with the physiographical and botanical features of a large area in the south-west of Western Australia."

"A Trip to Busselton and Yallinghup Cave, W.A.," by Messrs. F. Pitcher and J. Stickland. Mr. Pitcher's section of the paper dealt principally with the flora of the district, while Mr. Stickland described the formation and features of the Cave.

EXHIBITS.

By Mr. C. Daley, B.A., F.L.S.: Foraminiferal Limestone, from Batesford Quarry (near Geelong).

By Mr. J. W. Audas, F.L.S.: Dried specimens of 30 species of Western Australian plants.

By Mr. A. E. Rodda: Dacite, illustrating stages of decomposition, from Mt. Dandenong.

By Mr. A. J. Tadgell: "Brown Beaks," *Lyperanthus suaveolens*. These orchids were gathered at Ringwood on September 23. Kept fresh in water for about 6½ weeks.

By Mr. and Mrs. D. Paton: Orchids from Boronia and Mt. Dandenong—*Microtis atrata, M. parviflora, M. porrifolia, M. oblonga, Calochilus cupreus, Prasophyllum Frenchii, P. odoratum, P. brevilabre,* and *Caladenia congesta.*

By Mrs. Eaves: *Prasophyllum Australe,* from French Island.

By Mr. V. Miller: *Pterostylis pusilla,* from Eltham. Specimens of Western Australian timbers.

Mr. Mrs. Rich: *Pterostylis Mitchelli,* from Rushworth.

By Mrs. E. Coleman: *Calochilus cupreus, Sarcochilus parviflorus,* and *Prasophyllum odoratum* (various forms) from Healesville.

By Mr. F. Pitcher: "Wood pears" (seed pods) of *Xylomelum occidentale,* seeds and seed vessels of Kurrajong, *Brachychiton diversifolium,* var, *occidentale,* foliage and fruits of *Eucalyptus macrocarpa,* specimen of *Drosera Planchoni,* over 5 feet 6 inches long, flowers of *Banksia grandis* and *B. serrata,* and other specimens from Western Australia.

FOREST AND SAND-PLAIN.

By C. DALEY, B.A., F.L.S.

(Read before the Field Naturalists' Club of Victoria, November 8th, 1926.)

A party of 55 visitors to the A.A.A.S. Congress in Perth visited the Karri forests and the South-western wheat belt of Western Australia. The line generally follows the scarp of the Darling Range, a coastal range or up-lifted pene-plain. It is mainly along this range that the Jarrah, *Eucalyptus marginata,* forests occur When passing through the more settled hills and valleys of the Jarrah country, we entered the area where the Karri, *Eucalyptus diversicolor,* is the predominant tree. The country is well-watered and wooded.

At Pemberton the Chief Mills are situated. They are chiefly supplied with Karri from the Big Brook Working Circle, eight miles distant. The tramway passes through some interesting country where, besides Karri, the Marri, *E. calophylla,* Blackbutt, *E. patens,* the Bull Banksia, *B. grandis,* and a little Jarrah also grow. We crossed the foaming Big Brook with its cascades bordered with the graceful Peppermint, *Agonis flexuosa,* and River Banksia, *B. verticillata.* The leguminous *Albizzia lopantha,* the bi-pinnate wattle, *Acacia pentadenia,* with light graceful foliage, and the Hazel, *Trymaliam spathulatum,* are pleasing features of the vegetation, while the Karri Oak, *Casuarina decussata,* a handsome member of the order, with distinctively green foliage, arrests the attention.

One misses in these forests the ferns which are so striking a feature of the Gippsland and Dandenong forests. Despite the heavy rainfall, averaging here 60 inches, ferns are few in number, and there are no tree-ferns. To some extent, in the Darling Range vicinity, their absence is compensated for by the presence of the graceful Zamia Palm, *Macrozamia Fraseri,* and the profusion of Blackboys, *Xanthorrhœa,* and the less widely spread Drum-head, or Silver-head, grass-tree, *Kingia australis,* peculiar to W.A.

In heavy rain we reached the forest, where the huge Karri trees were being cut for the mills. The trees rise erectly to a great height before sending out branches almost horizontally, and the foliage is not so dense as in many of our gums. A tree recently felled was 265 feet high, the girth at 4 feet 6 inches being 33 feet.

Several species of orchids were noticed, *Acianthus*, *Glossodia*, *Pterostylis*, larger in flower than corresponding species with us. In some places the Bracken, *Pteridium*, grew vigorously.

Pemberton is about 14 miles from the Indian Ocean, and more than 100 miles from Bunbury. Some fine flowers grow in the vicinity, notably the Blue Bush, *Hovea elliptica*, and *H. trisperma*, a large Oxylobium, and a pretty Wax-flower, *Crowea*.

Leaving Pemberton early in the morning, we returned to Bridgetown, on the Blackwood River, through beautiful country, in the Jarrah area, frequently admiring variously-hued patches of wild-flowers growing gregariously here and there along the route. In the Blackwood River district the Jarrah grows to great size; but much has been cut out, and around Bridgetown, in and out of the ranges, there is much orchard cultivation, apples and oranges growing well. We resumed our journey, through well-wooded country, with typical Jarrah forest, relieved by the Macrozamias and Blackboys. We gathered the fragrant *Boronia megastigma*, which grew in abundance at one place. Approaching Donnybrook, we passed through some weathered hills of sandstone formation. Neighbouring rocks of gneissic and micaceous formation were of interest.

One particular valley on the route was golden in colour, from the presence of Acacias in full rich bloom.

At Donnybrook, wild flowers were plentiful, and varied in colour. The "Native-Pear," *Xylomelum occidentale*, two species of *Persoonia*, and the Quandong, *Fusanus acuminatus*, were seen in fruit.

From Donnybrook our course was eastward, the character of the forestal covering changing with distance from the more hilly country, the eucalypts decreasing in size, and the Jarrah gradually disappearing as the country becomes more open, and the rainfall decreases from 35 inches to 50 inches in the Darling Range, to 15-25 towards the eastern plain. Plants of Leguminoseae Myrtaceae Goodeniaceae, and Proteaceae, are increasingly numerous in species; in regard to the last-named, W.A. having 431 species against 58 in Victoria. In the preponderance of this order, which has many striking and interesting forms, there seems to be indirect evidence of closer land connection with South Africa in ancient times than with Eastern Australia. A common Eucalypt is the Wandoo, *E. redunca*, and the Marri, *E.*

calophylla, and the Mallet trees, *E. astringens*, and *E. Gardneri*, grow on the hill slopes.

Next morning found us in the South-west Wheat-belt, where the country was undulating, and xerophytic conditions were increasingly prevalent. Proceeding northward to Narrogin, we found scrub east of the town of much interest, the vegetation being markedly xerophytic in character. Acacias, Banksias and other Proteaceae were numerous, while composites, in the form of Helichrysums, were in profusion. Here, too, was found *Dryandra longifolia*, growing on the rubbly hillsides in profuse bloom. A visit was made to the Agricultural Farm, a few miles distant. The country was undulating and the Eucalypts were of fair size. *E. megacarpa*, with its large and numerous seed-cases, the Swamp-Yate, *E. occidentalis*, and the Rasp-berry-jam tree, *Acacia acuminata*, grew freely. The latter is much used for fencing, being, like our Murray-pine, unattacked by white ants.

From Narrogin, in a north-easterly direction, the country, becoming drier in character, and the vegetation much less in size, assumes more of the appearance of the mallee in Victoria, with corresponding plant forms peculiar to, or resultant from, diminished rainfall. Leaving Narrogin, we travelled to Northam, then due east, over almost plain country, to Tammin. We motored about 12 miles to typical sand-plain country, formerly designated a desert—it has poor, sandy soil over slightly undulating land. Occasionally there occurs a surface outcrop of granite, indicative, in a thirsty land, of a possible soak near by. The rainfall is about 12 inches.

The characteristic of this sand-plain, bare only in small patches, is the profuse growth of small shrubs covering it for miles, the plants showing remarkable adaptation in growth, shape and structure of stems, leaves and branches to conditions of aridity, heat, and the effects of wind. In the occasional hollows, where scant moisture may sometimes gather, there may be Eucalypts, Acacias, Banksias, Casuarinas, Fusanus, etc., of mallee type and size; but generally, the vegetation is low and mainly of Proteaceae, Myrtaceae, Leguminosae, and Epacridaceae, and produces a floral display, interesting in variety, and strangeness of form, as well as attractive in the wealth and contrast of color.

At Merredin, on the trans-continental line, 166 miles from Perth, motor-cars were in waiting. My conveyance travelled 50 miles over fairly level country, only an occasional worn granite outcrop rising from the plain, which in appearance greatly resembles our stretches of mallee. Frequently we passed large areas under wheat, unfenced and without habitations, the selector waiting until the harvest is gathered before erecting a wire-proof fence or a dwelling. The scrub stands close at the edge of many of these holdings, and, of course, rabbits take toll of the young wheat at first. Occasionally, beside mallee eucalypts and associated vegetation, patches of larger timber occur, containing the Salmon gum, *E. salmonophloia*, red Morrel, *E. longicornis*, and *E. gracilis*, and the twisted trunks of the Gimlet gum, *E. salubris;* also *Melaleuca uncinata.* The soil varies from that of the sand-plain to a red loam of good quality, productiveness being partly dependent upon the amount of rainfall.

Next morning most of our party diverged on another branch north-west by a loop-line to Wyalkatchem. A stop was made outside of Merredin, at a particularly fine patch of pink *Helichrysums.* The country seemed to be more open, otherwise little different—sand-plain, mallee, gimlet and salmon gum, wild-flowers in abundance. The gums of these dry areas have one feature in common, as seen against the sky-line; that is, a straight limbless stem for some distance, then a branching process like the ribs of an open umbrella, and a scanty crown of leafage, remarkably like a parachute in appearance.

Wyalkatchem is the centre of an important wheat-producing district, and types of land vary from lightly-timbered land, with Gimlet, Salmon and Morrell gums, mallee growth, low scrub, and a halophytic vegetation bordering on salt-pans. Right through this south-western belt one is struck by the evidences of vigorous development, the air of breezy optimism everywhere prevalent, the growth of towns, the fine type of settlers on the land, and the rapid transformation of the wilderness into areas of cultivation. This is the more wonderful in these vast, open spaces, where rivers and water-courses are unknown, the rainfall uncertain, and intermittent. To some extent this has been remedied by sinking wells, which may strike fresh, instead of salt, water; by careful conservation of the natural supply; and by the extension of the great Mundaring scheme through subsidiary pipes.

Leaving Wyalkatchem, on our last stage to Perth, the drier plains of promise were gradually left behind for those increasingly more verdant and better watered; our only stops being at one place to gather Kangaroo-paws by the wayside, and at another some other floral prize. Then our loop-line joined the trans-continental again at Northam, and we passed on down the picturesque and fertile valley of the Swan, reaching Perth, after our journey of 916 miles by train, and probably 150 by motor.

In a few years, with average seasons, Western Australia is destined to become the premier wheat-producing State of the Commonwealth. Her output of wool is annually increasing, and prosperity is evident on every hand. Many years ago in the United States, Horace Greeley gave the advice, "Young man, go west." To a young man from the Eastern States, with a stout heart and a small capital, in my judgment, no better advice could be given.

EXCURSION TO ELTHAM HEIGHTS.

About 36 members and friends took part in the excursion to Eltham on October 23, when the weather was perfect. We crossed the bridge to the western side of the Diamond Creek, and walked among the wooded hills and valleys, which usually are rich in "bird life." Few birds were nesting, the earlier species having their broods abroad, while the later ones were just beginning to build.

Several of the nests observed had been raided by "bush pirates," and the contents eaten or otherwise destroyed—a not unusual occurrence in "Bird Land." A nest of the Grey Thrush, *Colluricincla harmonica*, built on the ground at the foot of some saplings—an unusual place for a Thrush to build—has been robbed of newly-hatched chicks, and the nest was damaged. A nest of the Olive-backed Oriole, *Mimetes sagittata*, also had been destroyed. However, we were able to examine another Oriole's nest, which contained two nestlings, and one infertile egg. The parent birds would not show themselves. Several nests of the White-winged Chough, *Corcorax melanorhamphus*, were noted, and a flock of the birds was seen.

Among the birds most in evidence were the Rufous and Golden-breasted Whistlers, *Pachycephala rufiventris*, and *P. pectoralis*, Black-faced Cuckoo Shrikes, *Graucalus melanops*, Kookaburras, Wattle-birds, *Acanthochaera carunculata*, and other Honeyeaters, Butcher-birds, *Cracticus destructor*, and Cuckoos.

Of special interest was a pair of White-winged Trillers, *Lalage tricolor*, which had just hatched a brood of three in a nest in a fork of a Red Box Eucalypt, near the house. The birds were very trustful, especially the male, which had to be pushed off the nest when a different pose was desired by a photographer.—W. C. TONGE.

The Orchids of Victoria

BY EDWARD E. PESCOTT, F.L.S., F.R.H.S.

PART IV.

13. P. SUTTONI, Rogers and Rees (after Dr. C. S. Sutton). "Alpine Leek-orchid."

Plant up to a foot in height, leaf abbreviated. Flowers, 6 to 9, white and purple, *distant on the spike,* shortly stalked, ovary stout. Lateral sepals free, narrow lanceolate, purple, darker down the middle. Petals purplish, broadly linear. Labellum on short claw, recurved, margins entire; tip broadly blunt and rounded, margins membranous, crenulated; callous portion narrow. Appendages of column large, with small ovate basal lobe.

This is a dainty, slender alpine species, and has only been recorded as a midsummer flowering plant, from the high altitudes of the Eastern Alpine mountains.

The following species (except 23) are all dwarf in character, not often exceeding a few inches in height, and are mostly autumn and winter flowering.

14. P. NIGRICANS, R.Br. (blackish). "Dark Leek-orchid."

A dwarf species from 2 to 5 inches high, leaf very small and usually absent at flowering, base of stem surrounded with many fibrous sheaths. *Flowers dark purple, almost black,* dense on spike, which is not 1 inch in length. Dorsal sepal erect and broadly hooded; lateral sepals free, greenish. Petals triangular lanceolate, dark purple. Labellum dark purple, glandular, oblong, narrowing to a recurved, acute tip; margins somewhat crenulate; callous portion raised, oblong. Lateral appendages to column as long as the petals, bifid; stigma oval.

A very diminutive species, but often conspicuous on account of its colour in late autumn, especially if the grass be dry. Recorded from the N.E., S. and S.W., usually growing in open grassy lands, or in open heathy moors. Found in all the Eastern States and Tasmania, flowering from April to June.

15. P. FUSCO-VIRIDE, Reader (dusky green). "Dusky Leek-orchid."

Dwarf; habit and size similar to No. 14. Flowers green or greenish, quite minute, on a small crowded spike; labellum dark purple, sessile. Dorsal sepal very small, green, widely lanceolate, with recurved point.

Lateral sepals, green, free, lanceolate. Petals greenish, with dark central stripe. Labellum variable from oblong to oblong ovate, on a movable hinge, tip recurved; margins entire. Lateral appendages to column, bifid, triangular lanceolate.

This is a very rare species, recorded only from the Mallee fringe, near and north of Dimboola; and also from Yorke Peninsula in South Australia. Flowers in April and May.

16. P. RUFUM, R.Br. "Red Leek-orchid."

Dwarf, from 5 to 8 inches high, slender; flowers very minute, closely crowded in a short spike, *reddish;* ovary small, oblong; lateral sepals free, lanceolate; dorsal sepal ovate. Labellum reflexed, *not ciliate*, lanceolar; inner plate with raised margins large. Lateral appendages to column, very small, bifid.

A rare dwarf species, recognised by its dull reddish flowers. Recorded from the East, South, and South-west. Also from Queensland, New South Wales, Tasmania, and New Zealand. Flowers in autumn.

17. P. BRACHYSTACHYUM, Lindl. (short-spiked). "Purple Leek-orchid."

Dwarf; flowers in a dense, short spike, greenish purple or greenish brown. Lateral sepals free, ovate lanceolate; dorsal sepal shorter and broader. *Labellum, oblong, hinged, not ciliate*, the inner plate thickly raised. Appendages to column, unequally 2 lobed, longer than the column.

A rare species, autumn flowering, recorded from Newstead and Ringwood. Found also in Tasmania. The flowers are much lighter than those of No. 16, and are much smaller.

18. P. DESPECTANS, Hk.f. (despising—i.e., insignificant). "Tiny Leek-orchid."

Dwarf, up to 6 inches in height, sometimes taller in the shade. Leaf nearly as long as flower stem. Spike short, dense; flowers very small, dark brown, red, or purplish. Lateral sepals face, *tipped with glands*. Labellum acute, narrow oblong, reddish, hinged. Lateral lobes of column entire falcate.

A fairly frequent autumn species recorded only from the South in Vic.; also from Tasmania.

19. P. FIMBRIATUM, R.Br. (fringed). "Fringed Leek-orchid."

Dwarf, up to 8 inches high, very slender; spike very short, flowers quite small, dull red or dull purplish red. Lateral sepals free, dilated at base: dorsal sepal short.

lanceolate. Petals somewhat streaked, acuminate. Labellum hinged, linear oblong, *dilated towards the upper end, conspicuously fringed with* long hairs. Lateral appendages of column long and bifid.

An uncommon autumn species. Recorded from all districts except the North-west; also found in New South Wales.

20. P. ARCHERI. Hook f. (after Archer, a botanist). "Archer Leek-orchid."

Dwarf, up to 8 inches high. Leaf small, bract like. Flowers few on an inch long spike, loosely arranged, dark red brown in colour. Lateral sepals dilated at base, *dorsal sepals somewhat ciliate on the margin.* Labellum dark purple, narrow oblong, hinged, *fringed with long hairs, tapering towards the upper end.* Appendages to column long and bifid.

Another slender autumn and winter species easily recognised by its reddish colour and marked ciliations. Recorded from the South, South-west and North-east; and also from Tasmania.

21. P. INTRICATUM. C. Stuart. (Flowers intricate). "Elfin Leek-orchid."

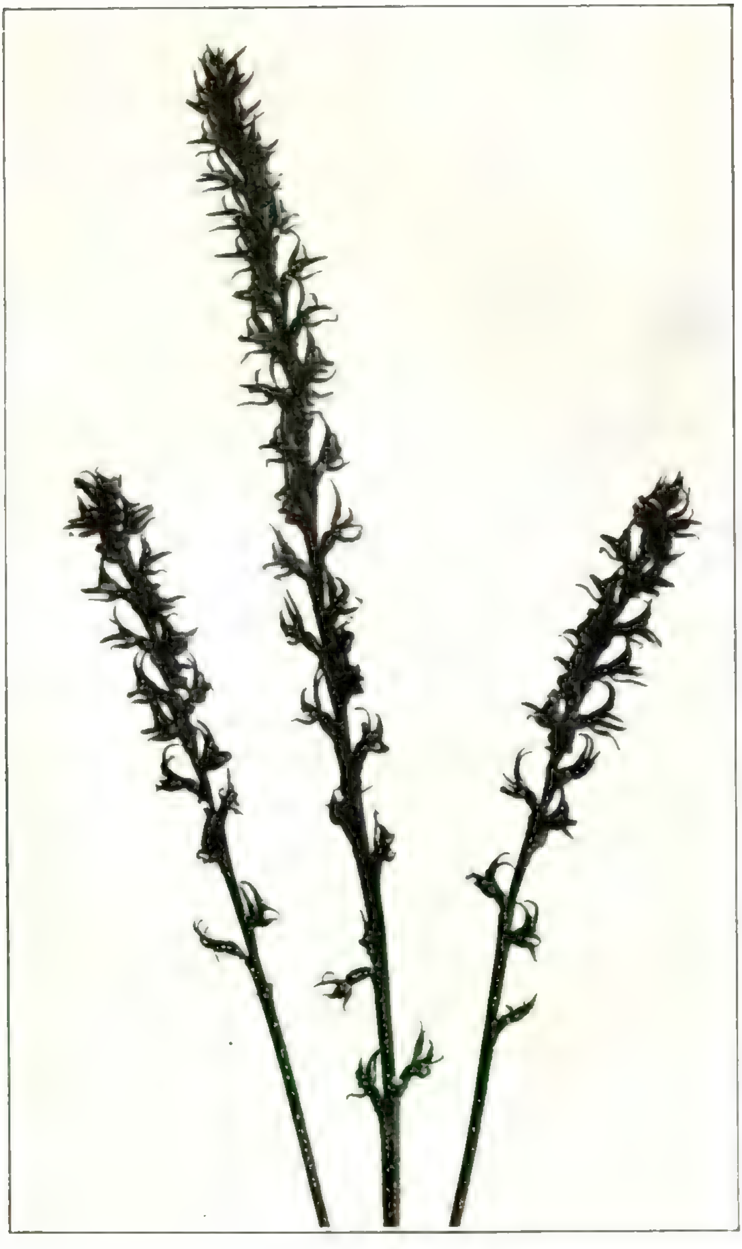
Dwarf, similar to the several preceding species in habit and growth. Flowers greenish or yellowish green, quite tiny, up to 6 on a *short abbreviated spike.* Lateral sepals lanceolate, very wide; dorsal sepal tip acute. Petals yellowish, with purple stripes and margins. Labellum broad, with recurved tip; margins entire, but sometimes crenulate; *fringed with short hairs.* Lateral appendages to column unequally bifid, *ciliate on upper half of margins.*

The marked ciliations and the short spike indicate this species. It is quite uncommon, not often being seen. It is autumn flowering; and is recorded from the South and North-east. It also occurs in New South Wales and South Australia. Sometimes the flowers are purple or dull purplish in colour.

22. P. CILIATUM. Ewart and Rees. (Hairy). "Hairy Leek-orchid."

A very dwarf species, up to 5 inches high; leaf shorter than flowering stem. Flower spike about half an inch long. Flowers quite tiny, purplish green. Lateral sepals free, united at base. Labellum long and narrow, tip blunt, channelled down the centre, *margin fringed with short hairs.* Lateral appendages to column bifid into two short lobes, the *outer margin fringed with short hairs.*

Plate XI.



PRASOPHYLLUM FRENCHII, F.v.M.
"Stout Leek-orchid."

A very rare winter species, quite small and recorded only from Green Valley, in the county of Talbot, where it was collected by F. M. Reader in 1910.

23. P. DIXONI, F.v.M. (after J. E. Dixon, a Victorian naturalist). "Golden Leek-orchid."

Leafless at time of flowering. Tall, up to 9 inches in height. Flowers few, medium size, close together, yellowish green or yellow. Lateral sepals united, broadly lanceolar. Petals finely pointed. Labellum broadly ovate, *not fringed, but faintly ciliate*, or somewhat finely denticulate towards the summit. Lobes of labellum short and bifid.

This very rare species was found in 1892 by C. French, Jr., and named after his friend. The locality is recorded by Mueller as "Near Kardinia Creek," but it really should be Oakleigh District. It has but the one locality; and has been collected only two or three times. It is conspicuous by its yellow colour, growing usually in heathy tea-tree country.

5. CALEANA, R.Br.

(After G. Caley, an early collector of New South Wales plants).

Flowers reversed. Perianth segments linear. Dorsal sepal incurved, lateral ones spreading or reflexed. Labellum articulate on a movable claw, with the base of the column; the lamina ovate or oblong, peltate, its surface smooth, convex, or tuberculate. Column long, broadly 2 winged. Glabrous terrestrial herbs with solitary, narrow, linear leaf. Flowers from 1 to 4 on thin slender stems.

This remarkable genus is limited to Australia and New Zealand, and has only four species, three of which occur in Victoria. The flower, when fully expanded remarkably resembles a wild duck in flight, the head and bill of the duck being the labellum, the two broad wings of the column representing the body of the bird. The labellum (head) is quite definitely irritable, and if the end of the column (bill) be smartly touched the labellum will spring inwards, folding itself in between the wide wings of the column. After twenty minutes or half an hour have passed, the labellum opens out once more.

1. C. MAJOR, R.Br. (larger). "Large Duck-orchid."

Slender, glabrous, from 6 to 12 inches high. Leaf radical, narrow lanceolate, about 2 inches long, both leaf and stem usually purplish red, stem somewhat wiry. Flowers one to three on stem, *reversed*, purplish or reddish brown, often tinged with green when young. *Lateral sepals and claw of labellum inserted at the base of the column, surface of the labellum quite smooth.* Column incurved, broadly winged from anther to base.

The large duck-orchid is a unique species, and has been recorded from all districts but the North-west. It is sparsely distributed, and on account of its dull colour, is not readily noticed. The irritable character of the labellum is readily seen; the purpose being that an insect is readily imprisoned, and so fertilization results. It is also recorded from Queensland, New South Wales, South Australia and Tasmania, flowering in November.

2. C. MINOR, R.Br. (lesser). "Small Duck-orchid."

Very slender, glabrous, 3 to 7 inches high. Leaf solitary, radical, very narrow linear, about 1 to 2 inches long. Stem wiry; stem and leaf dull purplish green. Flowers about half the size of No. 1, *reversed,* 1 to 6 on stem, reddish brown, occasionally greenish, on slender pedicels. Labellum peltate. *Lateral sepals and claw of labellum inserted at the end of a foot or basal projection of the column; surface of labellum tuberculate.* Column widely winged as in No. 1.

The Small Duck-orchid is readily recognised by the several quite small flowers, with the roughened or tubercular surface of the labellum (duck's head). The labellum is irritable, as in *C. major.* It is not so common as the former species, and is recorded from the south, south-west, and east. Flowering in November. Recorded also from Queensland, New South Wales and Tasmania.

3. C. SULLIVANII, F.v.M (after D. Sullivan, a Victorian botanist.) "Spectral Duck-orchid."

Stem very slender, short. Leaf small, narrow linear, plant only a few inches high. Flowers, one to three on stem, very small. Labellum broadly lanceolar ovate, pointed at the summit, similar in form to both the former species, *beset with papillular glands towards* the centre, not attached in a peltate manner, the margin free of tubercles: membrane of the column terminated on each side by a small deltoid lobe.

This is a very rare species and has been found only two or three times, on the Grampian mountains. The difference is in the unusual form, and structure of the labellum. It is an early summer flowering species.

6. SPICULAEA, Lindl.

Sepals and petals linear, dorsal sepal erect. Labellum articulate at the base of the column and movable with a linear claw. Column long, *wingless except for two acute subulate or falcate auricles on each side*, foot usually conspicuous. Usually leafless at time of flowering. Stem somewhat fleshy; flowers several, sometimes apparently reversed.

This genus has been known for many years under the name of *Drakaea*. The separation from that genus was very necessary, owing to the differences in the structure of the column. In *Drakaea*, the auricles or wings to the column are broadly and bluntly triangular, and are situated near the base of the column; while in *Spiculaea* the auricles are acutely, long triangular in shape and pointed, being placed towards the top of the column. The two Victorian species are now under *Spiculaea*. There is a third species recorded from West Australia.

1. S. IRRITABILIS, Reich, Schltr. (irritable). "Hammer-orchid."

Stem from 6 to 9 inches high, leafless at time of flowering. Flowers 3 to 8 on pedicels within small bracts. Flowers small, greenish, tinged with red. Sepals and petals narrow linear, dorsal sepal exceeding the other segments. Labellum articulate at the end of the basal projection, having a linear claw, the lamina hammer-shaped, and peltately attached, ciliate with long hairs on the upper surface, the upper lobe emarginate, or terminating in a short smooth point, the lower lobe or appendage being hairy.

Only one specimen has been collected in Victoria, and that many years ago from East Gippsland. The specimen was lost, so the species is not now represented in the National Herbarium. This species is retained in Victorian lists on the evidence of Mr. C. French, Jr., who was attached to the Herbarium at the time of its receipt, and who well remembers Baron von Mueller receiving it. The movable hammer shape of the labellum is remarkable and distinct.

It is recorded also from New South Wales and Queensland, and is an early summer flowering species.

2. S. HUNTIANA, F.v.M. (after R. Hunt). "Elbow-orchid."

Leafless at time of flowering, from 3 to 6 inches high, with two clasping stem bracts. Flowers reddish green, two to seven on slender pedicels, each pedicel embraced by a blunt bract. Sepals and petals narrow linear. Column having the typical auricles of the genus. Labellum articulated on a movable joint (elbow) to a linear projection of the column: divided at the end into two long narrow divergent tail-like ends, which are generously supplied with long purplish hairs. There are two anterior processes, claw-shaped, each terminating in a round, shining, knob-like gland. This end works on the elbow joint, fitting in to, and clasping the column.

This remarkable and very rare little orchid has only been found in Victoria at Cravensville (A. B. Braine), near Tallangatta, flowering in November and December. Mueller records it from Mount Tingiringi, in New South Wales, as an autumnal species. It is also recorded from Blackheath, in the Blue Mountains. It is stated by Mueller that the labellum is irritable. Recent observations have failed to detect any irritability; possibly Mueller mistook the movable hammer-like action for an irritation action.

7. CHILOCLOTTIS, R.Br.

(Beautiful Tongue).

Low terrestrial herbs, with two radical leaves, or nearly so. Dorsal sepal erect, concave, incurved, contracted at the base. Labellum on a very short claw, broadly ovate or obovate, conspicuous, beset with variously arranged calli, often stalked, or with tubercular calliosities. Flowers green, greenish or purplish.

There are eight species in the genus, seven being Australian. Two also occur in New Zealand, one of which is also Australian. Five species are recorded for Victoria. The plants are all dwarf, and the conspicuous labellum is usually very beautiful. The plants are all one-flowered.

Petals reflexed—Species 1 and 2.

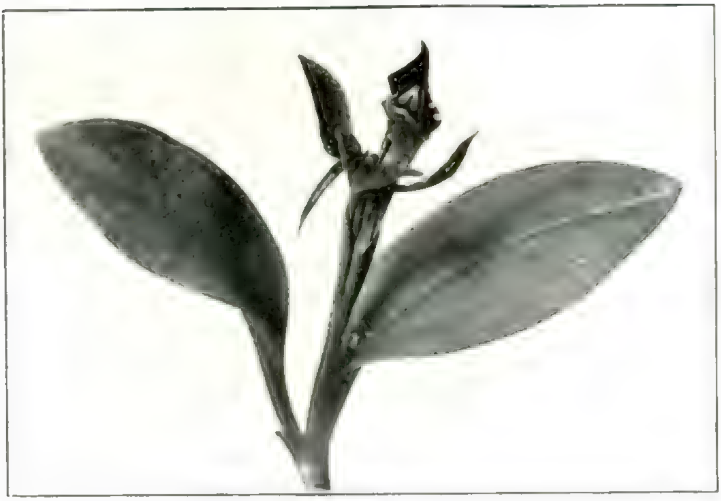
Petals spreading or ascending—Species 3, 4 and 5.

1. C. REFLEXA (Labill.), Cheel. (*C.diphylla*) (reflexed-perianth). "Autumn Bird-orchid."

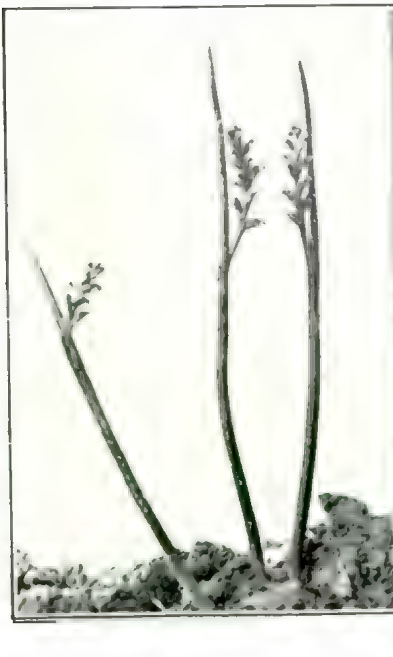
Labellum usually obovate, on a short claw; a few stalked calli on the end of the claw; a large, usually green callus at the base of the lamina; many crowded variously shaped calli in front of the large one, extending almost to the tip. Column about as long as the petals.

This species was formerly known as *C. diphylla*. This name is not at all apt, as all of our Chiloglottis have two leaves. It is usually an autumn flowering species, about four inches high, but flowers are frequently found in winter and spring. It is a cool climate orchid, being

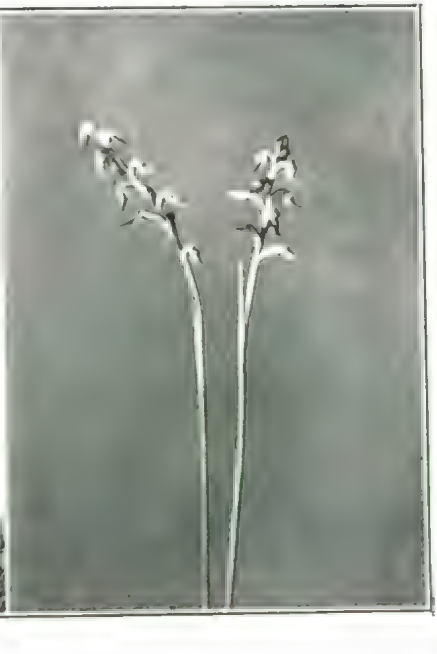
Plate XII.



CHILOGLOTTIS GUNNII, Lindl.
"Common Bird-orchid."



MICROTIS ATRATA, Lindl.
"Swamp Leek-orchid."



PRASOPHYLLUM NIGRICANS, R.Br.
"Dark Leek-orchid."

recorded from the South, East and North-east, usually growing in shaded places.

Recorded also from Queensland, New South Wales, and Tasmania.

2. C. TRAPEZIFORME, Fitz. (Labellum trapeze-shaped). "Broad-lip Bird-orchid."

Labellum rhomboid or trapeze-shaped, on a short claw; no calli on the claw; lamina with a single large, stalked compound brown callus near the base. Leaves two; plant only a few inches high.

A widely distributed, but not common species, growing in cool districts, recorded from the South, East and North-east. Found also in New South Wales.

3. C. GUNNI, Lindl. (after R. Gunn, a Tasmanian botanist). "Common Bird-orchid."

Flowers, the largest of the genus, reddish brown. Labellum broadly ovate, large. A large, brown, stalked clavate callus at the base, and a short, thick, almost sessile glant in front of this near the centre; then a somewhat irregular row of small stalked calli on each side of these. Calli frequently crowded.

A common species often found in great colonies, flowering in early spring. Recorded from all districts except the North-west, and usually abundant in mountain areas. Occasionally a colony will be found growing on the trunk of a tree-fern.

4. C. MUELLERI, Fitz. (after Baron von Mueller). "Green Bird-orchid."

Flowers always green, growing upon tree-ferns. Labellum ovate or broadly lanceolate, on a very short claw. Lamina with shortly stalked or sessile brownish or green calli irregularly grouped in centre and at the base.

This green-flowered species is recorded only from the South, and there only from the Dandenong Ranges and adjacent localities. Fitzgerald records it as originally collected on the Loddon River by C. French, Senr. Mr. French states that this is an error. His specimens came from the Dandenongs. I consider this species to be practically an epiphyte. It is rarely found growing in soil, usually being seen in colonies on tree ferns. When seen growing in the ground, it has settled there from a fallen tree fern, and then the flowers are not nearly so large as when seen on the ferns.

5. C. PESCOTTIANA, Rogers (after E. E. Pescott). "Alpine Bird-orchid."

Flowers medium size, 3 to 7 inches high, greenish bronze. Labellum oblong, rounded at tip, on a very short claw; one large crescent shaped sessile callus in centre, and in front of others, another large, bilobed stalked callus about midway between this and the base of the lamina; numerous stalked calli variously sized, often small, between these two groups; a somewhat irregular row of small calli running on either side of middle line from bend of lamina to its base.

This is a very rare species, found only at Cravensville in the North-east, near Tallangatta, and collected by A. B. Braine.

In his paper on "The Orchids of Victoria," Part II., in the October *Naturalist*, Mr. E. E. Pescott states that the "Scented Sun-Orchid," *Thelymitra aristata*, Lindl., is "recorded from all districts but the north-west." In October, 1912, I sent a small collection of orchids from Sea Lake, in the north-western mallee district, to Dr. R. S. Rogers, who identified them as follows:—*Thelymitra aristata*, *Pterostylis rufa*, *P. mutica*, *Caladenia carnea*, *C. dilatata*, *C. tentaculata*, *Prasophyllum fuscum*.—J. C. GOUDIE.

CUP MOTH AND GUM LEAVES.

Even field naturalists pardon Eve for bringing Eucalyptus foliage into her home. But there is a tiny enemy, 1 inch by 3-16ths inch only, lurking nearby, which should be watched for. Recently, among the hills of Whittlesea, while I was finding my 100 floral treasures, my wife was engaged collecting gum-tips. She called out in pain, and found that her fingers had come in contact with the spines of the larva of the Cup Moth, *Doratifera Oxlei*. In the absence of ammonia, I applied an alcohol, and permanganate of potash, but the nettle- or ant-like stinging remained for three hours. The Cup Moth larva lies flatly, gluing its mouth to the edge of the leaf, as can be seen when the leaf is turned over, but it does not look the aggressor it is. On the back behind the dark shield-like skin are two crossed lines, in which are two pairs of circular bristle processes, corresponding in position with the double pair of bristle processes at the hind part of the caterpillar. These are all simultaneously erected, but are otherwise immovable when the larva feeds in its natural state, or is irritated. When it is normal, or feeds in captivity, the processes severally fold into lined triangles in cavities on the back, and turn inward. Adjoining the spines are brilliant scarlet triangular patches. Mr. J. A. Kershaw kindly identified the Cup Moth larva for me.—A.J.T.

A few complete sets of Mr. H. B. Williamson's valuable papers on Victorian Ferns (reprinted from "The Naturalist") are available; price, 2/6 per set.

NESTING HABITS OF THE WHITE-BACKED MAGPIE.

BY D. DICKISON.

The White-backed Magpie (*Gymnorhina hypoleuca*) is extremely plentiful in the open areas of Southern Victoria, where it is not unusual to see flocks of 30 or 40 birds during the autumn and winter months. With the approach of the breeding season, these flocks separate into pairs, which seek suitable places for rearing their young. Though Magpies usually are bold and fierce in nesting time, at the nest they are shy birds, and very few nature photographers have succeeded in obtaining pictures of their home life. This season I attempted the difficult task of photographing a pair that had their nest in a large tree, at Ashburton.

The nest was situated in a fork of a branch 57 feet from the ground, and when found, on August 1st, had every appearance of being completed. The continuous absence of Magpies led me to believe that the nest had been forsaken. Three weeks later, however, it was noticed that, when other Magpies perched in the tree, they were immediately driven away by another pair, which came from neighboring trees.

On September 11th the female was brooding. When disturbed she would remain away for a few minutes only. Two days later, with the aid of rope slings, I climbed the tree, and found that the nest contained two birds a day or two old, and one egg on the point of hatching. Up to this time the adult birds had been fearless; it was not until September 15th, when I had fastened the camera to a branch near the nest, that their shyness became apparent. That afternoon passed without either bird coming to the nest, although, at times, they would perch near the camera, and look into the nest to see that all was well with the nestlings. By this date the other egg had been hatched, and all three nestlings were sparingly covered in soft dark down.

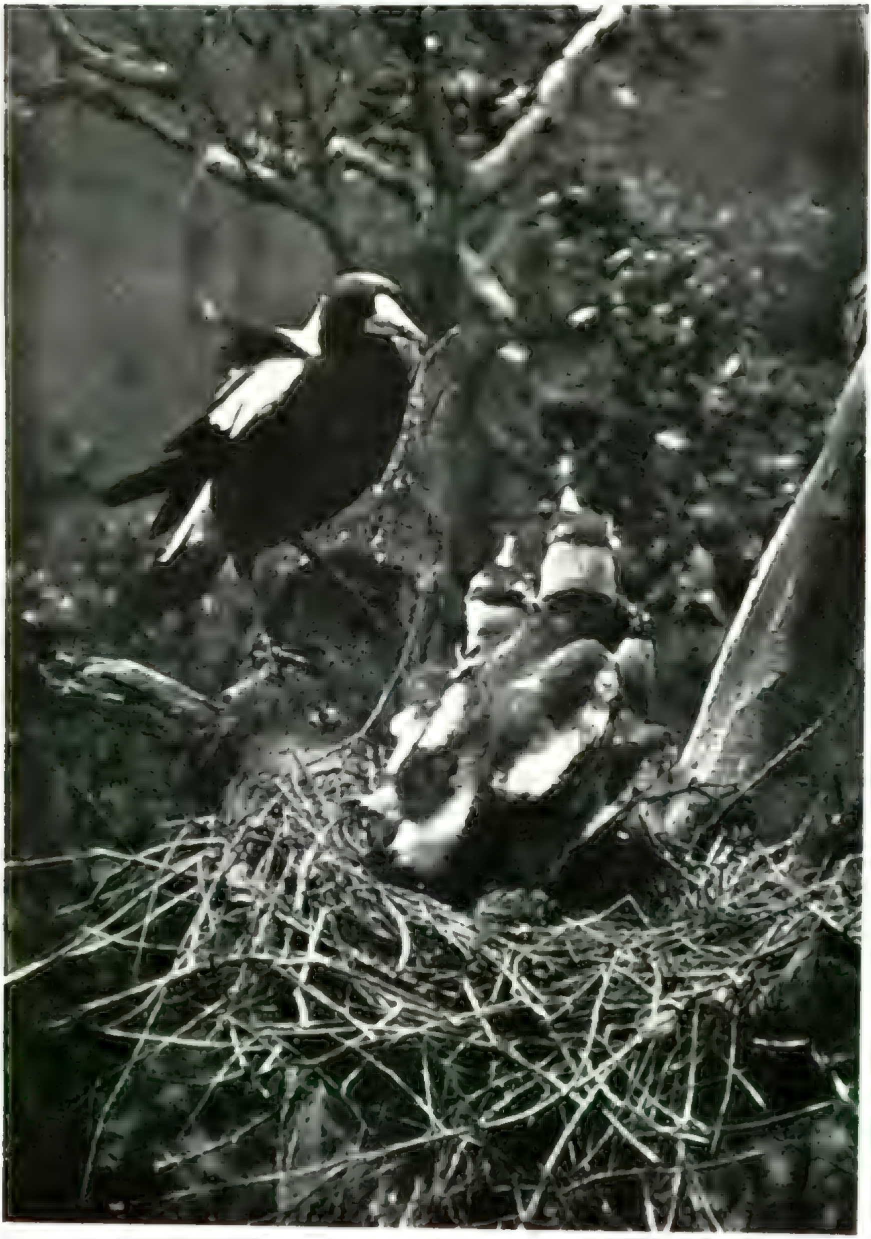
The nest was in an ideal position for photographing, as it was possible to place the camera on another branch, 8 feet away. To make an exposure, I attached 40 yards of thin fishing line to the shutter release, then concealed myself that distance from the nest. Sometimes the wind was so strong that the pressure on the line was sufficient to release the shutter; and in this way several plates were spoiled.

Undaunted by failure, I resolved to spend the following week-end at the nest, and accordingly the camera was fixed opposite the nest shortly after mid-day on Saturday. In the meantime, the birds had lost none of their shyness, and all that afternoon, until almost dusk, they remained away from the nest. They were usually feeding on the ground near the nest-tree, or, perched, watching me from another tree, 200 yards away. The camera was left in position that night, and by 6 a.m. next day I had arrived at the scene again. The adult birds were then busily engaged in feeding the hungry brood; but after my arrival they declined to visit the nest. That it was my presence, and not the camera, that kept them away is shown by the fact that, whenever I walked to other parts of the paddock, the parent birds would instantly go to the nest. To conceal myself, I built a bower of green gum branches; but the male Magpie was able to perceive me through any small opening, and would remind me of my presence by swooping swiftly over the bower. The sight of the Magpie is wonderfully keen. The remainder of the day passed without the adults visiting the nest.

By September 30th the young birds were partially feathered, but still far from being ready to leave the nest. Once again, on October 9th, the camera was placed near the nest, and again the result was failure. The nestlings had grown considerably within the week, and the eldest was able to stand on the side of the nest and flap its wings. As on the previous occasion the camera was left at the nest overnight, and I was "on duty" at dawn next morning, when I found the female on the nest. After waiting for three hours I heard the young ones calling loudly, and at the same moment one of the adults settled on the edge of the nest, but remained only for an instant. After a further interval of an hour the bird came to the nest again when I was able to take a photograph of it in the act of feeding its young. Afterwards, throughout the day, visits by the parents were made at irregular intervals, and further pictures were obtained. The approach of the parents was usually heralded by the calling of the young, and thus I could be in readiness to release the camera shutter when one settled at the nest.

I devoted the afternoon of October 13th, the whole day on the 14th and 17th, and the afternoon of the 19th, to

Plate XIII.



White-backed Magpie at Nest.

[*Photo D. Dickison.*

photographing this pair of birds. In all 6½ days were spent in working at this nest, and during nearly the whole of that time the weather was unsuitable for my purpose. After October 10th the birds lost all fear of my presence, and came to the nest most regularly to feed the young ones. Just prior to the time when the young disappeared, the male would attack me very fiercely as I climbed the tree to change a plate, or take the camera down. As a rule, it is only after the hatching of the eggs that Magpies adopt bold tactics, attacking all persons who venture too near the nest-trees.

The eldest nestling obtained most of the food that was brought to the nest, and in consequence developed more quickly than the others. The youngest proved to be a weakling, and on October 17th it was found dead under the tree, having been crowded out of the nest by its robust companions. On this date the eldest fledgling exhibited a great desire to leave the nest, and would flap its wings in anticipation of flying. On October 19th it had gone, and was not seen with the parents, who were busily engaged in feeding the remaining young one, which had disappeared on October 26th. According to these records, young Magpies remain in the nest a few days more than five weeks.

Generally, the nest of the Magpie is a large, bulky structure, but this nest was very small, quite unfitted for holding three large fledglings. Nests may be built in almost any kind of tree, and in some cases telegraph posts are selected as sites; or, as in certain Gippsland districts, the tops of tall tree-ferns—when the new season's fronds appear the nests are displaced, and usually blown to the ground in the first wind storm.

Magpies have been known to nest in the same tree every season for many years; any other Magpie trespassing in their domain beingquickly attacked and driven away. In many cases, these birds appear to have their own territories, over which they hold sole control, but, contrary to this theory, I know a paddock at Lilydale, where several pairs breed in trees only a few hundred yards apart, and seem to rear their broods in harmony.

That all Magpies do not nest annually is proved by the numerous small flocks that are seen around Ashburton, and elsewhere, during August and September, the principal breeding-months for the species.

THE KING'S PARK, PERTH.

BY J. W. AUDAS, F.L.S., F.R.M.S.

(Read before the Field Naturalists' Club of Victoria, November 8th, 1926.)

King's Park, an area of 1,018 acres, is situated on the heights of Mount Eliza, overlooking the City of Perth, and the Swan River. Excepting small portions, the Park is virgin bush land, and wildflowers grow abundantly in their native habitat.

As one enters the Park at the main gate, a fine stretch of road is seen, with flowering gums, *Eucalyptus ficifolia*, on either side. These trees, in the blooming season, appear as a blaze of fire for a distance of three-quarters of a mile. Some bear blooms of the brightest red; others flowers in shades of terra-cotta, where from the road overlooking the river, a magnificent view is commanded, scenic beauties are added to by large patches of wild flowers; the Swan River Myrtle, Hypocalymma robustum, an elegant shrub from 1 ft. to 3 ft. in height, with erect, rigid, slender branches, and flower spikes of a lovely shade of purple-crimson; Rush Lily, *Sowerbaea laxiflora*, a graceful plant, with rush-like leaves, and clustered umbels of pretty mauve-pinkish flowers, sweet-scented. Wild Violet, *Hybanthus calycinum*, a small shrub with purple flowers, the flattened petals sometimes very pale in tint, and suspended from a tiny bell-shaped calyx; Poison Shrub, *Isotropis striata*, a small shrub with yellowish-brown flowers, streaked with crimson; and Milkmaids, *Burchardia umbellata*, springing up everywhere.

Continuing along the road, a sample of the bush as it covered the whole of the mount in its virgin state is passed through. No attempt at artificial improvement has been made, or is intended to be made. The area is reserved for the native flora, which, in the season, is beautiful and varied in colour and form. Rioting among the tall shrubs and trees are three handsome climbers: the Coral Pea, *Kennedya coccinea*, with its large pink masses of flowers; *Spurious Sarsaparilla*, *Hardenbergia Comptoniana*, a hardy evergreen twiner, which literally covers in a mantle of purple the shrubs and undergrowth on which it loves to spread, and West Australian Clematis, *C. aristata*, var. *occidentalis*, tall and bearing trailing masses of fluffy white flowers, and clinging to any available support by means of the leaf stalks, and twining round any object they touch.

At the foot of a steep declivity the road turns to the right, and thence there is a sharp rise through virgin bush. Presently a triangle is reached which forms the junction of the three roads, one being the main drive, the second, via Fremantle, and the third, the May Drive. A journey down the steep hill and back is especially interesting to the botanist. The following plants may be noted: Peppermint tree, *Agonis flexuosa*, a myrtaceous tree, with dense drooping foliage and white flowers—the leaves, when crushed, having a strong perfume resembling peppermint; Shaving-brush Flower, *Dryandra floribunda*, a bushy proteaceous shrub, from 4 ft. to 8 ft., with numerous creamy-yellow flowers, which are stiff and spiky—in bud, the flower closely resembles a shaving brush; *Cryptandra arbutiflora*, a rhamnaceous shrub, with twiggy branches and fragrant white flowers; *Ricinocarpus glaucus*, an erect glabrous shrub, two feet in height, with white, waxy flowers, it belongs to the Euphorbiaceae. Here numerous species of leguminous plants abound and brighten the Park with glowing masses of yellow and red, namely, *Acacia pulchella*, an elegant shrub, from 6 ft. to 8 ft., with pinnate leaves and glorious drooping clusters of golden blossom; *A. cochlearis*, a rigid shrub of several feet, with globular yellow flower heads; *Oxylobium capitatum*, a shrub of 3 ft. or 4 ft., with orange and red flowers; *Jacksonia Sternbergiana*, an erect shrub of about 6 ft., with drooping branches and yellow flowers; *Daviesia juncea*, a glabrous undershrub, with small yellow and red flowers; *D. horrida*, an erect shrub of several feet, the flowers are red and orange; and *Chorizema ilicifolium*, a small weak shrub, with slender branches and flowers of orange and red.

Flowers of different shades of blue abound. *Leschenaultia biloba*, a beautiful celestial blue, is seen on all sides. This species is considered by many to be one of West Australia's most handsome wildflowers. Here also is found the Blue Tinsel Lily, *Calectasia cyanea* and Nodding Blue Lily, *Stypandra glauca*. These plants are familiar to Victorians, as they grow luxuriantly in the Grampians and other parts of this State. Many interesting orchids abound in the Park, as *Glossodia Brunonis*, *Prasophyllum Fimbria*, *Microtis alba*, *Pterostylis vittata*, *Thelymitra vilossa*, *Caladenia discoidea*, *C. Menziesii*, *C. Patersoni*, variety *longicauda*, and *C. flava*, which grows freely throughout the Park.

The May Drive was planted in honour of soldiers and sailors who fell in the Great War. The trees are

Oriental Planes, and to each is affixed a cast-iron plate bearing the name of a deceased soldier, the number of his regiment, and other details. Passing by the Subiaco turn-off, the First Honour Avenue is entered. Here the most of the trees are British Oaks. A grass circus is encircled with native trees, principally Eucalypts.

There are miles of pathways leading to various points in the Park; some are steep, and a rapid drop of 250 feet to the river road may be made. Hackett's Path descends through a series of grottoes, artificially formed of stones and coral, to the terraces below. Another beautiful path has a branch to grottoes and end on the terrace below. En route, the visitor passes through what is known as the "Lover's Walk," and crosses a miniature canyon, which, at one time, was watered artificially, but in recent years has been dry, owing to shortage of water.

Among conspicuous flowers in the Park, the Kangaroo Paws probably are the most interesting. Magnificent specimens of two species grow in profusion. They are the Red and Green Kangaroo Paw, *Anigozanthes-Manglesii*, and the Small Orange and Red species, *A. humilis*. Other favourite wild flowers growing in the Park, are:—*Hovea trisperma*, a small shrub of about 18 inches, a very handsome plant, with beautiful purple flowers; *Conostephium pendulum*, a small Epacridaceous shrub, with white flowers tipped with pink, seen on all sides; *Hypocalymma angustifolium*, an elegant, erect, bushy plant, about 2 ft. in height, with pinkish flower spikes; *Trichinium Drummondii*, a perennial plant, with purplish-pink flower-heads, often known as "Everlasting"; *Eriostemon spicatus*, a small, heath-like shrub of about 2 ft., with pinkish flowers in loose terminal spikes. *Lysinema ciliatum*, an erect shrub, 2 ft. in height, with slender branches, and white, star-like flowers, *Dampiera linearis*, a small shrub of about 18 in., with coerulean blue flowers; and *Pimelea sulphurea*, a handsome shrub, 2 ft. in height, with nodding flower-heads of a pale yellow colour.

The "Swan River Fern Palm," or "Zamia Palm," *Macrozamia Fraserii*, which is dispersed throughout the Park, adds a picturesqueness to the landscape, and seems to fill the place that tree-ferns occupy in our State. The forest trees of the Park, growing in their native habitat, comprise Jarrah, *Eucalyptus marginata*; Marri, or Red Gum, *E. calophylla;* Tuart, *E. gomphocephala*, and *Banksia attenuata*, the latter is very plentiful throughout the Park.

Occasionally fires break out in the Park and destroy considerable portions of the native vegetation, but every precaution is taken to prevent these occurrences.

EXCURSION TO FRANKSTON.

On October 16th 31 Club members and friends, including the Rev. George Cox and ten juveniles, members of the Mornington Naturalists' Club, visited Frankston. In the Park Reserve, familiar shrubs were seen in full bloom, viz.—*Aotus villosa*, *Pimelea octophylla*, *P. humilis*, *Epacris obtusifolia*, *Dillwynia floribunda*, *D. cinerascens*, *Bredemeyera ericinum*, *Hibbertia acicularis*, *H. stricta*, *H. fasciculata*, *H. densiflora*, *Leptospermum myrsinoides*, *L. scoparium*, *Daviesia ulicina*, *D. corymbosa*, and *Ricinocarpos pinifolius*. After walking a mile through heathy country and sandy rises, we reached the Sweetwater Creek. Along the banks Scented Paper Bark, *Melaleuca squarrosa*, and Swamp Paper Bark, *M. ericifolia*, were in gorgeous bloom. Nearby a number of small plants were gathered, the Purple Bladder Wort, *Utricularia dichotoma*, Tiny Bladderwort, *U. lateriflora*, Pink Bladderwort, *Polypompholyx tenella*, and Hairy Stylewort, *Levenhookia dubia*.

Proceeding over Mount Eliza, we noted the beautiful Purple Eyebright, *Euphrasia collina*, and Grass Trigger Plant, *Stylidium graminifolium*. Mr. A. G. Hamilton, who has made some observations on the pollination of Trigger plants, noted that the usual time for the column to remain sprung is from 10 to 20 minutes, then it rests for from 20 minutes to four hours. The weather affects the movements of the column; it is inactive when it is cold or moist, but works well on warm dry days, when insects are also more numerous.

About a dozen species of orchids were seen during the afternoon, including *Caladenia Menziesii*, *C. Patersonii*, *C. dilatata*, *Microtis perrifolia*, *Thelymitra flexuosa*, *T. antennifera*, *T. carnea*, *Diuris longifolia*, *D. sulphurea* and *Cyrtostylis reniformis*.—J. W. AUDAS.

A pair of White-browed Scrub-Wrens, *Sericornis frontalis*, nested, this season, in a latticed room, that was intended for a fernery, but holds boxes of rubbish. The nest is among the scraps of ribbons and silks and lace in a lidless hat-box.—C. C. CURRIE, Lardner.

Victorian botanists will be interested to learn that Mr. J. M. Black's "South Australian Flora," part 3, which has been long looked for, is in the hands of the "Proof Reader."—A.J.T.

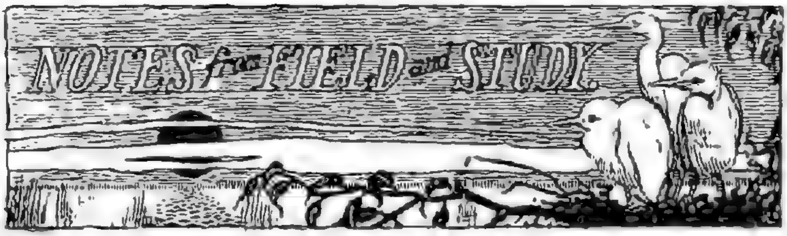
FOSSIL DISCOVERIES AT MORNINGTON.

During the last few years the Rev. Geo. Cox has gathered a little band of young enthusiasts in nature study, and the Mornington district, where they make their excursions, has proved over again how rich a store of knowledge lies there to hand, not only in botany and zoology, but also in its rocks and fossils. The leader himself has contributed many a fine and unique fossil specimen to the National Museum Collections. One of the more recent donations is a new species of the limpet-like *Montfortula* that will presently be described.

One of Mr. Cox's pupils, Mr. Colin Sache, has also recently found, and presented to the Museum, a unique fossil plant stem belonging to the "Horse-tail" group, or Equisetales. This fossil was found in the small outcrop of Jurassic sandstone, which occurs on the beach between Frankston and Grice's Creek. The fossil stem shows quite distinctly the joints whence sprang a series of leaflets forming an encircling sheath. On the stem itself are impressed other tiny circlets of leaves, as if they had been rubbed off the smaller branches, when the plant was inundated with the brown slimy mud. This plant fossil may be indeed related to the fossilised creeping roots with nodules of a similar plant that I discovered, some years ago, in the Jurassic beds of South Gippsland.

Another remarkable discovery has been made—this time among the Tertiary shells of Balcombe Bay—by another member of the Club, Miss Mary Evans. The fossil in question is distantly related to the cowries. It is a small, spindle-shaped shell, about three quarters of an inch in length. Although it is a sea-snail, its spire lies hidden within the shell, and its mouth extends the whole length. The name given to this shell is *Simnia exigua*. In trying to trace the meaning of the genus name, *Simnia*, some doubts arise as to the original spelling, which seems to have been *Scymnia;* and if so, it refers to the thicker body and narrower extremities, which may have given a fancied resemblance to a dog-whelp (compare *Scymnus*, the Spiny Dog-fish.)

Simnia exigua has never before been found at Balcombe Bay, but there are other specimens of this shell in the Museum, from Clifton Bank, Muddy Creek, Hamilton; so that the discovery made by our young field naturalist is of much value to those who are studying the ages of our fossil beds and who are attempting to find their relations to one another in the geological scale. —F. CHAPMAN.


NOTES from FIELD and STUDY.

THE RED WATTLE-BIRD'S WAYS.

Excepting the farmer and grazier, to whom the Red Wattle-bird (*Anthochaera carunculata*) renders valuable assistance in keeeping destructive insects in check, there are few who have a good word to say for this species. It is looked upon with suspicion by the fruitgrower, who is undecided whether to regard it as a friend or a foe; and being a bird of sombre plumage, with harsh, unattractive notes, it is not admired by the general public. I fear that, in some districts, even the bird-lover is unable to approve of the Wattle-bird's ways.

On Sperm Whale Head this bird is extremely pugnacious, and keeps its haunts free from most other species; for this reason it is not a favorite with the bird-lover here. The following notes are from personal observations in this locality.

During most of the year the Red Wattle-bird is not abundant; a few pairs, here and there, breed in the district, usually they associate in small colonies—up to about six pairs—each colony having a limited area from which its members never wander. But in autumn very large, wandering flocks of Wattle-birds are seen, especially at the end of the Head, where they are checked by the expanse of water that confronts them. These, I presume, are mostly young birds, from neighboring districts, which, driven away by their parents, are seeking pastures new. They do not cause any trouble among other birds, but fly from tree-top to tree-top, and circle high above, in preparation for the continuance of their flight. Their numbers gradually decrease, until, finally, only the "stationary" pairs remain. It is these pairs that have acquired the disagreeable habit, previously mentioned, which is especially noticeable during the nesting season.

This year three pairs have nests within sight of our house. They are quite friendly among themselves, but very few other birds can remain unmolested, near their breeding haunts. Most small birds—as Robins, Thornbills, Wrens, and Flycatchers—are driven back if they venture too close, while larger species—Black-faced Cuckoo-shrikes and Friar-birds, for instance—are chased away. The Wattle-bird will even annoy the Kookaburra by nipping at his tail as he flies past; and it is extremely jealous of other honey-eating species. It is aggravating, to observe some rare bird being ruthlessly driven away by a familiar species.

The territory governed by the three pairs of Wattle-birds comprises about nine acres surrounding our house—a Banksia clump in front being one of their favorite haunts. A few other birds, such as a pair of Magpie-larks and some Pardalotes, are permitted to be part-owners of this area; and there are others, such as Magpies and Currawongs, which enter the Wattle-birds' haunts in search of food, but are too large and fearless to be forced to leave them. The Rainbow Lorikeet is a courageous little bird; recently a few alighted in the Banksias and were immediately attacked by a pair of Wattle-birds. The intruders, however, proved to be equal to the aggressors in both strength and ferocity. I was pleased to see the Wattle-birds defeated for once, especially by smaller birds.

Lately, a male Wattle-bird has been taking crumbs from my food-tray, and apparently has the impression that the food is put there for his benefit only; nowadays, other birds can procure a meal only when the Wattle-bird is not watching. Very soon, he may be the only visitor to the tray. Species that are able to hold their own against the Wattle-birds are few indeed compared with those that are prevented from feeding or nesting about our house. Were Wattle-birds absent from Sperm Whale Head, many other species would be happier. But it is hardly just to judge a species from observations in one locality. I have wondered whether this contentious disposition of the Wattle-bird has been noticed by other observers. Maybe the few pairs here are unusually aggressive.—FRED. BARTON, JNR.

BIRDS IN A MALVERN GARDEN.

That our suburban gardens may provide food and nesting-sites for many different birds, is shown by a garden chronicle kept by Miss Joan Harper, of Avalon-road, Malvern. Her list stands at 39 species (with a query at 40), and many have nested in the pleasant territory, composed of several large neighbouring gardens with wide lawns, and high, sheltering hedges.

The latest arrival is a Rufous Fantail, *Rhipidura rufifrons*. "A new recruit for my garden brigade, and a lovely one, too!" Miss Harper writes, "appeared at about 7 o'clock in the morning. The sounds of an unfamiliar bird song, made me wake up more quickly than a hundred alarms! Next minute I was out in the garden, and there saw a charming Rufous Fantail, playing about in the Chestnut tree. The sun was shining right on him, and thus showed up his colours to perfection. An English Thrush is building in our big, creepered-trellis, on the side path; and a blackbird, in the next garden, has laid a second clutch of four eggs in the nest she used before. The Crimson Parrot is still about, and to-day I heard Brush Wattle-birds. Silvereyes and Blue Wrens were here a few days ago, and I heard the first Spinebills calling —they went away when the nesting season commenced."

ABNORMAL GROWTHS IN PLANT LIFE.

There are few students who do not keep preserved in spirit, or in some other way, specimens labelled "monstrosities," or "abnormities." The botanist has his folder, containing distorts and specimens of fasciation or teratology.

When the plant is in full growth, it contains a number of ferments, or enzymes, so that, as Scott Elliot observes, in the wonderful chemical laboratory, something may happen to influence the delicate balance of supply and demand in the life of the plant and the proportion and nature of its various ferments. Sometimes the lower part of the stem is undivided, and will, about midway or higher up, branch out into two similar parts. Thus we see unification and separation. The superabundant nutrition will produce a diseased condition giving rise to a growth that destroys the balance of expansion. Fasciated stems appear as isolated cases among other normal plants growing under precisely similar conditions.

Recently, at West Kinglake, where the Onion-leaf Orchid, *Prasophyllum brevilabre*, was the predominant plant in flower, specimens ranged in height from 6 in. to 16 in. Double flowers were by no means uncommon. One robust specimen was a branching form, quite 16 inches high; half of it bore flowers. A branching *Prasophyllum* is a great rarity, and this one branched 2½ inches from the apex of the spike. Below the branch, fine flowers appeared in regular rows around the stem, giving it a pretty and uncommon appearance. Ordinarily, the flowers are arranged alternately up the spike. Nature had evidently intended this plant as a Siamese twin, but had relented.

Another abnormity I found at Ringwood some time ago, in two of a number of specimens of the slender *Thelymitra Elizabethae* (one of some six Victorian orchids described by Dr. R. S. Rogers in a recent paper read before the Royal Society of S.A.). There were two appendages, one very long and the other short, in front of the column (or in the part shaped like the letter U). These were considered by Dr. Rogers to be of great interest, as representing in a sterile form, the third stamen (A3) of the inner whorl. This stamen usually is amalgamated with the labellum, to form central ridges and rarely survives as a definite staminode. —A.J.T.

AUSTRALIAN ANTHROPOLOGY.

The Anthropological Society of South Australia was formed in July, 1926, with the object of promoting the study of anthropology, with special reference to the Australian aboriginal. Dr. R. H. Pulleine was appointed Chairman, Prof. F. Wood Jones, Dr. T. D. Campbell, and Mr. C. P. Mountford form the Committee, and Mr. N. B. Tindale, South Australian Museum, is the Honorary Secretary.

Meetings are held monthly, and much original data on the following subjects, has been brought forward by members:—Message sticks, smoke signals, birth, burials, magic, petroglyphs and rock paintings. The information will, it is hoped, be published in the near future. Men outback, who have accepted Honorary Corresponding Membership, supply much information that is new in response to the *questionnaires* regularly sent out. Interest is being aroused and the original membership of 14 has nearly doubled. A complete card catalogue of works on Australian aborigines is being compiled, under the direction of Dr. Campbell, and different members are compiling records of native camp-sites, burial grounds, occurrences of petroglyphs, the distribution of tribes, etc.

Members of the Society recently visited Eden Valley (50 miles from Adelaide) and examined recently-discovered rock shelters and camp-sites; some fine implements were found. As a further result of the interest in anthropology awakened by the Society's activities, many fresh specimens of native handiwork are being donated to the national collection.

EXCURSION TO TOORADIN.

A small party journeyed to Tooradin on November 6, and spent a pleasant and profitable day. The weather was ideal for the seaside. Along the road from the railway station, flanked on both sides by grazing paddocks, and at times running parallel with a main drainage channel, introduced plants were the feature of the vegetation, among them being a few plants of the Ox-eye Daisy, *Chrysanthemum leucanthemum*. Swamp Paper-bark, *Melaleuca ericifolia*, lined the road in some parts, and here and there a Black Wattle, *Acacia mollissima*, was seen in bloom. Some fine specimens of these trees, in full bloom and fragrance, were seen later, in the township. A detour to the west was made, to examine a sandy hill covered with Manna Gum and Bracken, but few flowers rewarded the walk. A few scrappy blooms of Wedding Bush, Common Parrot Pea, and Aotus, with one orchid, *Microtis parviflora*, were the only finds, but our bird leader demonstrated here the method of bringing up the parents, White-eared Honey-eaters in this case, by imitating the weak, chirping of young birds.

We entered the township from the west, and examined the vegetation on the banks of the creek, up which the flood-tide waters of Westernport were rushing. Species found in bloom on the banks of the creek were Swampweed, *Selliera radicans*, and Creeping Brookweed, *Samolus repens*, while Yellow Sea-lavender, *Statice australis*, was noted in early-bud stage.

The main feature of the shore vegetation at the mouth of the creek is White Mangrove, *Avicennia officinalis*, densely covering a large area of tidal mud flats. No flowers, but some buds, and half-ripe fruits were found. Tooradin is the nearest place to the city where these curious plants may be studied. During a walk of two or three miles along the shore, many unfamiliar plants were met with, the rarest being Salt Plagianth, *Plagianthus spicatus*, which grew sparingly on the partially inundated sea-marsh land on which Samphire, *Arthrocnemum arbusculum*, Beaded Glasswort, *Salicornia australis*, Marsh Saltbush, *Atriplex paludosum*, Sea-berry Saltbush, *Rhagodia baccata*, and Trailing Jointweed, *Hemichroa pentandra*, were thickly interspersed.

On the drier parts the needle-pointed leaves of the Coast Spear-grass, *Stipa teretifolia* (in fruit), were a menace to unprotected legs.

The most attractive feature of the saline-flats was the wealth of colour displayed by the Rounded Pig-face, *Mesembrianthemum australe*. The plant grew in large patches, often quite round, and the fleshy foliage varied from blood-red through pink and yellow to bright green, which, with the pink rays of the large flowers, made a gorgeous display. This was relieved by the occasional bright yellow patches of Water-Buttons, *Cotula coronopifolia*. In many of the patches of the Pig-face was a central mass of dead runners and leaves; outside this a zone of dead fruits with ripe seeds, then bands of colour, green, yellow, and red foliage, with the flowers on the last zone. They reminded one of Fairy Rings of fungi, and the same explanation, no doubt, would apply.

Other plants gathered on this area were *Sebaea albidiflora*, *Leptocarpus tenax*, *Hydrocotyle capillaris*, *Lobelia platycalyx*, *Apium prostratum*, and *Distichlis spicata*. Adjoining this saline marsh-land was a belt of Swamp Paper-bark, with very little grass or herb plants; and inland from this a sandy belt covered with Manna Gum, where Slender Stackhousia, *S. viminea*, Twiggy Aster, Rough Fireweed and Variable Groundsel were blooming. Two specimens of Tiger Orchid, *Diuris sulphurea*, were gathered here.

Report on birds by Miss J. Galbraith:—Although we spent little time watching birds, several interesting species were noted. The thickets of Tea-tree provided perfect nesting sites for White-eared Honey-eaters, and we found these graceful birds in all parts of the district visited. Often they flew within a few feet of us. We were much interested by the varied notes of these birds, several of which could not have been recognised as those of the same species, had they not already been familiar to us. The Grey Thrush was often heard, and the piping of Pallid Cuckoos sounded about us all the time.

Among the belt of Melaleuca along the shore we heard, again and again, the note of an Eastern Whip-bird, rising sharply above the songs and warblings of Striated Thornbills and Blue Wrens. In the salt-marshes, we watched a small flock of Sharp-tailed Sandpipers, wading in the shallow water. Above them flew several Pelicans, and beyond, where the deeper water was ruffled into waves between the mangroves, Silver Gulls swept up and down. A Grey Fantail was seen in the Melaleuca. Wood Swallows, *Artamus tenuirostris*, flew overhead or darted to chase a Thrush or one of the many allied Flycatchers, whose presence, clearly, was not desired. They did not molest a Black-and-White Fantail, *Rhipidura leucophrys*, seeking insects on the grass, but a pair of Red-wattle birds incurred their fierce anger. A Laughing Kookaburra greeted us as we entered the town; Swallows skimmed through the sunshine, and Noisy Miners mingled their peculiar notes with the music of Black-backed Magpies and Grey Butcher-birds. Of introduced birds, Goldfinches, Sparrows and Starlings were common, especially the last-named. One English Skylark also was seen just before it disappeared in the sky.—H. B. WILLIAMSON.

CUP DAY EXCURSION TO HURSTBRIDGE.

Ideal weather conditions marked the excursion to Hurstbridge on Cup day, November 2. Panoramic views from the crest of the hills were a delight, after the easy walking. Unfortunately, the electric power failed on our return railway journey, and with an hour spent on the platform at Hurstbridge, and another for the journey between Hurstbridge and Eltham, much time was spent in travelling. But we had other compensations; 157 botanical specimens were collected and named. Mr. V. Miller's time was fully occupied in identifying the calls of birds. Mrs. Geof. Healey collected "old" bird-nests for exhibition at the Club meeting.

Mr. W. H. A. Rogers supplies the following entomological notes:—Two species of butterflies were noted—the Painted Lady, *Pyrameis Kershawi*, and one of the Skippers. Several specimens of a little metallic green day-flying moth, *Procris viridipulverulenta*, were taken, and small grass-moths were plentiful. The larvae of two species of case-moths were found on dogwood (*Cassynia*), and a number of small beetles of different species were beaten out of Eucalyptus saplings and other shrubs. The locality seems a favourable one for entomologists.—A. J. TADGEL-

NEW ZEALAND FORAMINIFERA.

The Geological Survey of New Zealand has just published a monograph, by our fellow club-member, Mr. F. Chapman, A.L.S., on the Cretaceous and Tertiary Foraminifera and Ostracoda of the Dominion. A work of this nature satisfies a long-felt want, as, except for the papers published in 1864, by the Austrian scientists, Doctors Karrer and Stache, on the collections of the "Novara" Expedition, the Microzoa of New Zealand have been almost untouched.

Mr. Chapman has been enabled to make a comprehensive study of the subject, and he records the occurrence of 277 species and varieties of Foraminifera, 11 of which are new to science, and 28 species of Ostracoda, five of these being new. Although the New Zealand Tertiaries are rich in Foraminifera, they are excelled in this respect by our Victorian deposits. The monograph is illustrated by 22 plates, which give figures of all the species recorded. These include reproductions of Stache's and Karrer's plates, the nomenclature of these authors being revised. A very complete index is also provided.

Several species hitherto known from Australian fossil deposits only, are now recorded from New Zealand. Although our Janjukian polyzoal limestones are well represented by their equivalent, the Oamaru series, no fauna comparable with that of the Batesford limestone is disclosed, the only species of *Lepidocyclina* found, *L. dilatata*, belonging to an older horizon than those occurring at Batesford. A noteworthy record is that of *Miogypsina irregularis* (Mich.), a species characteristic of the middle Miocene of France and Italy, and not yet found in Australia, although it has been recorded from the New Hebrides by Mr. Chapman.

Mr. Chapman's researches have thrown fresh light on the relationship of the strata making up the so-called Cretaceo-Tertiary series of Hector and other New Zealand geologists. He regards the Amuri limestone as belonging to the youngest Cretaceous beds, while the Weka Pass stone, which has so far been unproductive of any of the larger fossils, which would aid in its satisfactory placing in the time scale, has provided a microscopic fauna of Tertiary aspect, which Mr. Chapman considers to be of Upper Eocene age.

The importance of the Foraminifera has not yet been realised in Australia, so it is pleasing to note that the Director of the New Zealand Geological Survey calls attention to the use made of them in correlative work in the Californian, Texas, and other Tertiary oilfields.—W.J.P.

"The Cretaceous and Tertiary Foraminifera of New Zealand," by F. Chapman, A.L.S.—Pal. Bull. No. 11, N.Z. Dept. Mines, Geol. Survey Branch, Wellington, 1926.

INSECTS OF AUSTRALIA AND NEW ZEALAND.

The publication of Dr. R. J. Tillyard's work, "The Insects of Australia and New Zealand," is a notable event for naturalists. The book is not only an important contribution to the science of entomology; it also sets a new standard for handbooks of the kind, ranking at once as a classic. For many years it must remain *the* work for all students of the insect faunas of Australasia. Indeed, it should be used by entomologists generally. Dr. Tillyard is recognised as one of the world's leading entomologists; his earlier book, "The Biology of Dragonflies," was a brilliant "introduction," as it were, to the present volume, in connection with which he has, necessarily since the field is so extensive, received assistance from numerous other workers, including several members of our Club.

Dr. Tillyard gives the essential facts regarding insects; a general outline of their classification and morphology, and more detailed accounts of the different Orders, keys to the Sub-orders, Super Families and Families, and accounts of all the Families in each Order. Sections deal with Life History, Distribution, Fossil History, Economics, etc., and large numbers of species are briefly described. No phase of the subject has been overlooked. The work, far from being a compilation, is marked throughout by originality. The author is a literary craftsman, as well as a great entomologist, and, in summarising facts to fit a page or two when they might furnish matter for a chapter, he does not make the text arid, but retains the style that makes for pleasant reading. Yet all he has written bears the clear sign of a highly-trained scientific mind. In brief, his book is a masterpiece.

The illustrations are from new drawings, mostly by the author himself, or from photographs made specially for the volume. There are eight plates in colour, a number of halftone plates, and text figures, delightful in their accuracy and detail. It is a pleasure to look through this gallery of insect portraits; while the student will find the illustrations a liberal education in general entomology.

The publishers (Messrs. Angus and Robertson Ltd., Sydney) may be congratulated, as well as the author;

they have produced a book worthy of its own high scientific excellence. Printing, paper, binding, and plates, all are in keeping. It is good to know that natural history works, equal in every way to the best that are published overseas, can be "made in Australia."

Though intended primarily as a text book, "The Insects of Australia and New Zealand" will be of great value to others than students; it appeals to the amateur entomologist, and the nature lover also, and, since the economic aspect of insect life is dealt with, to the orchardist, the pastoralist, and the farmer. The scientific entomologist will gain much from every chapter; the amateur, who reads the book with close attention, and refers to it frequently, will in time have a general knowledge of insect life, and be able to recognise a large number of species, the most of those he meets with on his natural history rambles.

No amateur Australian or New Zealand field naturalist, whose special interest is in entomology, need hesitate now to begin the study of one of the Orders, as represented in his own country. Dr. Tillyard has made the way easy for us all; given us a guide in this handsome volume, which, though rich in perhaps unfamiliar terms, and written with meticulous care for scientific accuracy, is not beyond the layman's understanding. Clear and concise definitions of the scientific and technical terms used, are given in an appendix, a valuable glossary.

Orders that too often receive scant notice in general works on entomology, in this volume are given due attention. Dr. Tillyard's extensive knowledge of Mayflies, Stoneflies and Dragonflies, has enabled him to reveal these insects to us, to write biographies of many species, and give fresh details concerning development and structure.—C.B.

PIED GEESE IN VICTORIA.

Formerly the Pied Goose, *Anseranas semipalmata*, or Magpie-Goose, as it is commonly termed, was abundant in Victoria, with headquarters among the Murray billabongs and lagoons. Its numbers steadily decreased, owing to the advance of settlement and indiscriminate shooting, until a common species became scarce in our State, and also in the Riverina. The drought of 1914-15 completed the decline; the Pied Goose disappeared from Victoria. There was no further record of it for this State, until November last, when it appeared again. I quote from a letter received from Mrs. A. D. Selby, who lives in a favorable locality for bird observing, in the Western District:—

"Water fowl are very numerous around here this year—there are many swamps filled from the channels, and the back country is drying up rapidly. I was very pleased to see a flock of Pied (magpie) Geese last week, not very shy."

These birds deserve the most rigid protection; but no game bird, however rare, is quite safe from the pot-hunter.—C.B.

The Victorian Naturalist

Vol. XLIII—No. 9. JANUARY 10, 1927. No. 517.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held on Monday evening, December 13th, 1926. The President, Mr. E. E. Pescott, F.L.S., occupied the chair, and about 140 members and visitors were present.

The President extended a hearty welcome to Mr. F. G. A. Barnard, who responded in appreciative terms.

LATE MR. FRANK WISEWOULD.

The President referred to the death of Mr. Frank Wisewould, one of the original members of the Club, and the following vote of sympathy with his relatives was carried in silence, members standing:—

> The Field Naturalists' Club of Victoria records with great regret the passing away of one of its original members, Mr. Frank Wisewould. Mr. Wisewould filled, with dignity and honour, high offices in the Club. He was a courtly and happy gentleman; he loved the beautiful in nature, and his passing hence leaves a blank that will never be filled. The Club extends its deepest sympathy to his sorrowing relatives.

CORRESPONDENCE.

From Secretary, Children's Hospital, thanking the Club for donation of £25, and suggesting that a member be nominated as a Life Governor.

From Combined Progress Associations of Shire of Fern Tree Gully, stating that the Forests Department had refused to accede to the request that Dandenong State Forest be proclaimed a National Park, and asking that the Club take further action in the matter.

REPORTS.

Reports of excursions were given as follow:—Sydenham and Bulla, Mr. A. L. Scott; Healesville, Mrs. E. Coleman; Millgrove, Miss M. R. Wigan; and Yan Yean, Mr. A. E. Rodda.

ELECTION OF MEMBERS.

The following were elected as ordinary members:—Mr. H. L. Torpy, Alma Road, St. Kilda; Dr. Cecil F. Tucker, Alma Road, St. Kilda; Mr. H. A. Knight, 50 College Street, Elsternwick. As Country Members:—Mr. Basil B. P. Waller, Glenalladale, via Fernbank; Mr. Jas. Yeates, Bairnsdale; Mr. Marc. Cohen, 29 Hope Street, Bendigo; Miss E. Lyle, Inverleigh. As Associate Members:—Master Geoffrey Byrne, 27 Albert Crescent, Surrey Hills; Master Albert Smith, 10 Lord Street, Carnegie.

GENERAL.

The President stated that arrangements were being made for a deputation, under the leadership of Sir Frank Clarke, M.L.C., to approach the Ministry early in the new year in regard to Dandenong State Forest being proclaimed a National Park, under the control of Trustees.

On the motion of M. G. Coghill, seconded by Mr. F. G. A. Barnard, Mrs. V. Miller was nominated as a Life Governor of the Children's Hospital.

The President drew attention to a press notice regarding Mr. F. Chapman's work as a Palæontologist, and spoke highly of Mr. Chapman's achievements.

In the absence of the Hon. Treasurer, the Hon. Secretary read the financial statement of the Flower Show, which showed an approximate profit of £124. The statement was received and adopted on the motion of Messrs. G. Coghill and E. R. Hammet.

LECTURETTES.

The President introduced the subject of the evening—"Birds—With Special Reference to the Kookaburra." The Hon. Secretary read a letter from Professor W. A. Osborne, who thanked the Club for its invitation to attend the meeting, but regretted that he was unable to be present.

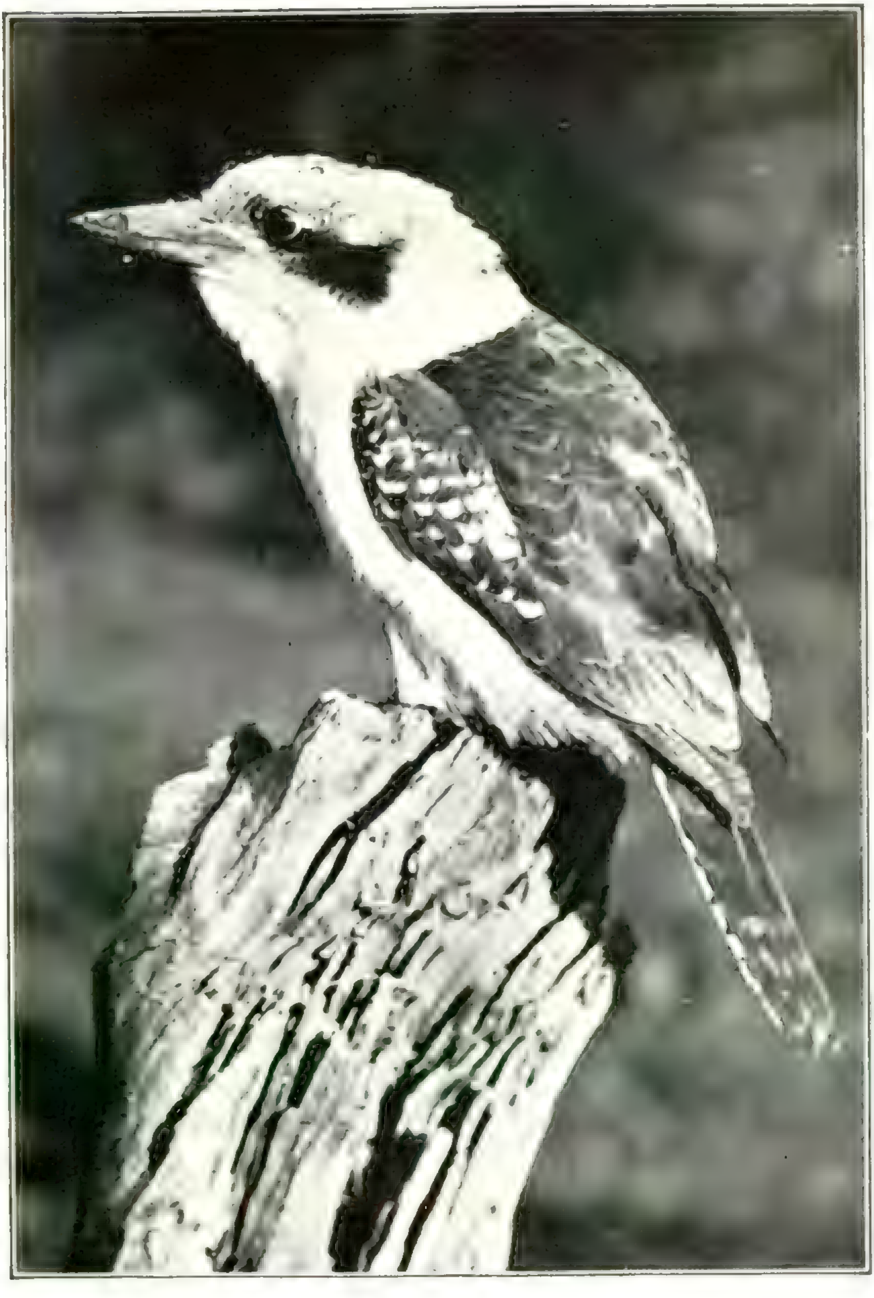
Mr. C. French, Jr., exhibited a fine mounted specimen of the Kookaburra, and a well-executed coloured drawing of the bird was shown by Master Guthrie.

Mr. A. Mattingley, C.M.Z.S., spoke in favour of the Kookaburra, and made a plea for predatory birds in general, quoting the opinion of British observers, who do not even condemn Cormorants.

Rev. Mr. C. Lang also spoke in favour of Kookaburras, and protested against the condemnation of the species generally, on account of the misdeeds of a few individuals. Mr. Lang exhibited a series of lantern slides of the Kookaburra and Lyre-bird.

Mr. Tom Tregellas spoke strongly in favour of the Kookaburra, stating that the Butcher-bird was a much more destructive species. A fine series of lantern slides, depicting Kookaburras and Lyre-birds, was shown by Mr. Tregellas in illustration of his remarks.

Plate XIV.



The Kookaburra.

Photo. C. Barrett.

Mr. H. B. Williamson showed a lantern slide of a Lyre-bird in nest, taken in the Buffalo Gorge, 39 years ago; also two slides of a Podargus, taken 25 years ago.

Mr. C. Barrett made a strong protest against the condemnation of the Kookaburra, and showed a fine series of lantern slides of this and other birds, taken by Messrs. R. T. Littlejohns, D. Dickison and himself.

Mr. C. French, Jnr., voiced a fear that the denunciation of the Kookaburra, in a newspaper article, might encourage farmers and others to destroy a very useful bird.

Mr. F. E. Wilson supported the views of the previous speakers.

Mr. P. R. H. St. John stated that the Kookaburra's misdeeds in the Botanic Gardens, were many. Every species of bird frequenting the Gardens, excepting the Sparrow, had suffered from its ravages; nevertheless, he did not favour its destruction.

Mr. C. Barrett moved—

> That the Fisheries and Game Department be requested not to accede to any representations which might be made for the removal of the Kookaburra from the list of protected birds.

Mr. V. Miller seconded the motion, which was carried unanimously.

EXHIBITS.

By Mr. E. E. Pescott: Christmas bush, *Prostanthera lasianthos* Labill.

By Mr. D. J. Paton: Orchids collected at Boronia—*Prasophyllum odoratum*, Rogers; *P. australe*, R.Br.; *Orthoceras strictum*, R.Br.; *Cryptostylis longifolia*, R.Br; *Pterostylis decurva*, Rogers.

By Miss J. W. Raff: Complete nymph of the Green Cicada, taken from its burrow in the Fitzroy Gardens, December, 1926.

By Mr. W. H. A. Rogers: Larva of *Nataxa flavescens*, with specimens of the moth, showing the marked difference in the sexes; "Moonlight Blue" butterfly, *Miletus delicia delos*, female, bred from a larva that was kept for six months, without being attended by ants.

By A. J. Tadgell: Growing specimen of "Fishbone Fern," *Blechnum* or *Lomaria discolor;* bipinnate variety, from near Mt. Dandenong. Although the type form is one of the commonest met with, in wet gullies or along watercourses, the exhibitor, a student of Victorian ferns for 30 years, has found only six specimens of the bipinnate form, but odd fronds show divisions of the pinnae. The bipinnate form has been collected in the Dandenongs, the Grampians, and the mountains behind Riddell's Creek. Thousands of growing ferns have been examined, resulting in a few finds only. Some years ago bipinnates were on sale in a seedsman's shop, in Swanston Street. At the Botanical Gardens, Melbourne, a number, true to the bipinnate form, was raised from seed. Three forms of the very variable "Weeping Fern," *Asplenium flaccidum*, from Warburton and Healesville. The differences are striking. No. 1 is very flaccid and covered with seed spores, much like the "Mother Fern," *A. bulbiferum.* No. 2 is thick and lined, with fewer seeds showing (seed-cases dispersed). No. 3 is thick, and, unlike No. 2, more open in the segments, with few seeds (sori) showing. Generally, this fern hangs gracefully from tree-ferns.

By Miss E. Hart: Flowering specimens of New Zealand Christmas Bush, *Metrosideros tomentosa.*

By Mrs. A. H. E. Mattingley: Young Wombat, about two months old. The mother was run over and killed by a motor car on December 3, and the young one was taken from her pouch. As the young remain in the pouch for at least three months, they are very difficult to rear in captivity. This specimen was in a state of collapse for four days, but by the aid of hot bottles and frequent doses of brandy it survived.

FRESH-WATER SPONGES.

Dr. N. Gist Gee, Assistant Resident Director, China Medical Board of the Rockefeller Foundation, Peking, China, wishes to obtain specimens of fresh-water sponges from Australia. He offers to send sponges from China in exchange for any Australian specimens that may be sent to him. The study of fresh-water sponges is a "personal hobby" of his, and he would be pleased to try to identify unnamed specimens, if they have any gemmules.

"The simplest method of preparing them (sponges)," writes Dr. Gee, in a letter to the President of our Club, "is to allow them to thoroughly dry out in the shade, and then wrap each specimen in a separate piece of soft paper (do not use cotton) and mail them in a light wooden or tin box. I would be glad to have them carefully removed from the surface of stone or wood upon which they may often be found growing, in order to show the whole sponge formation and to get the gemmules which often form a layer at the base of the sponge. Of course, if they are on grasses or small twigs, etc, collect them with these things upon which they grow."

GRASSES OF THE MELBOURNE DISTRICT.

BY P. F. MORRIS, NATIONAL HERBARIUM.

The purpose of this paper is to give those with little or no knowledge of grasses, such an understanding of the structure, together with the figures and keys, as will enable them to obtain some idea of our native grasses. I trust that the grasses may become better known, and their economic worth and beauty more appreciated.

Grasses are herbs with round or flattened (Fig. A.4), usually hollow stems or culms (never three-sided), solid at the joints or nodes (A.5), and two ranked, alternate, parallel-veined leaves, composed of two parts, the sheath and blade (Fig. A.6). At the junction of the sheath and blade, on the inside, is a small membrane, known as the ligule (A.2); this may take the form of a ring of hairs, or, sometimes, a transparent appendage of varying shape.

The spikelet, or inflorescence, consists of glumes and florets. The flowers generally are small, bi-sexual, naked, in the axil of a concave bract called the flowering glume (Fig. V.). A palea (B) envelops the flower, which consists of a one-celled, one ovuled ovary, two feathery stigmas (B), two and three stamens, with versatile anthers (B.1). Thus grasses have no proper floral envelope, or perianth. The spikelet is the unit of the inflorescence (V), and the floret is the unit of the spikelet (V.). The floret is never more than one-flowered, with one lemma and one palea (Fig. B.). The glumes and florets are always alternate (two consecutive ones never being borne above one another.

Many members of the Cyperaceae resemble the family Gramineae, but differ in having solid stems, without nodes, leaf-sheath not split, and having the flower supported by a single bract. The stems are often three-sided (A.3), whilst grass stems are never three-sided (Fig. 4).

GRAMINEAE.

Imperata cylindrica, Beauv. "Blady Grass." Fig C.

This cosmopolitan native grass has a large, silky-white head. The spikelets are in pairs, one being sessile, the other pedicillate. It has thick perennial rootstock, and is useful for binding sand and river banks.

Rottboellia compressa, L. "Mat-Grass." (*Hemarthria compressa*). Fig. W.

A decumbent, or creeping grass, sometimes rigid and ascending to two feet in height. Found on the margins of lakes, ditches, salt-marshes. Spikelets in pairs, one sessile, the other pedicillate; glabrous. Differs from *Lepturus cylindricus* (Fig. O.), which it resembles in having the spikelets solitary, terminal compressed, while *L. cylindricus* has the spikelets solitary and alternate, the nerves of the outer glume more prominent, the stem more cylindrical.

Themeda triandra, Forst. "Kangaroo-Grass." (From "Themed," the Arabic name.)

Perhaps the best known of our native grasses. It is much appreciated by stock; so much so, that in old pastures, it has become extinct. The plant produces little fertile seed. See Fig. U.

Zoysia pungens, Willd. "Prickly Couch-Grass." (*Osterdamia.*)

A perennial low grass, with creeping rhizomes, short, pungently pointed blades, and terminal spike-like racemes, the spikelets on short appressed pedicels. Spikelets one-flowered, laterally compressed, appressed flatwise.

Paspalum distichum, L. "Silt-Grass." Fig. E.

A grass with creeping stolons, and racemes in pairs at the summit of the culms. Grows in moist places. See Fig. E.

PANICUM.

Spikelets more or less compressed dorsiventrally, arranged in open or compact panicles. Spikelets with back of fruit placed towards the rhachis.

P. crus-galli, L. "Barnyard-Grass." (Fig. F.2.)

A cosmopolitan native grass of annual habit. Spikelets closely attached to the branches of the panicle, in two or four rows on one side of the stem. Spikelet sometimes turns from green to purple.

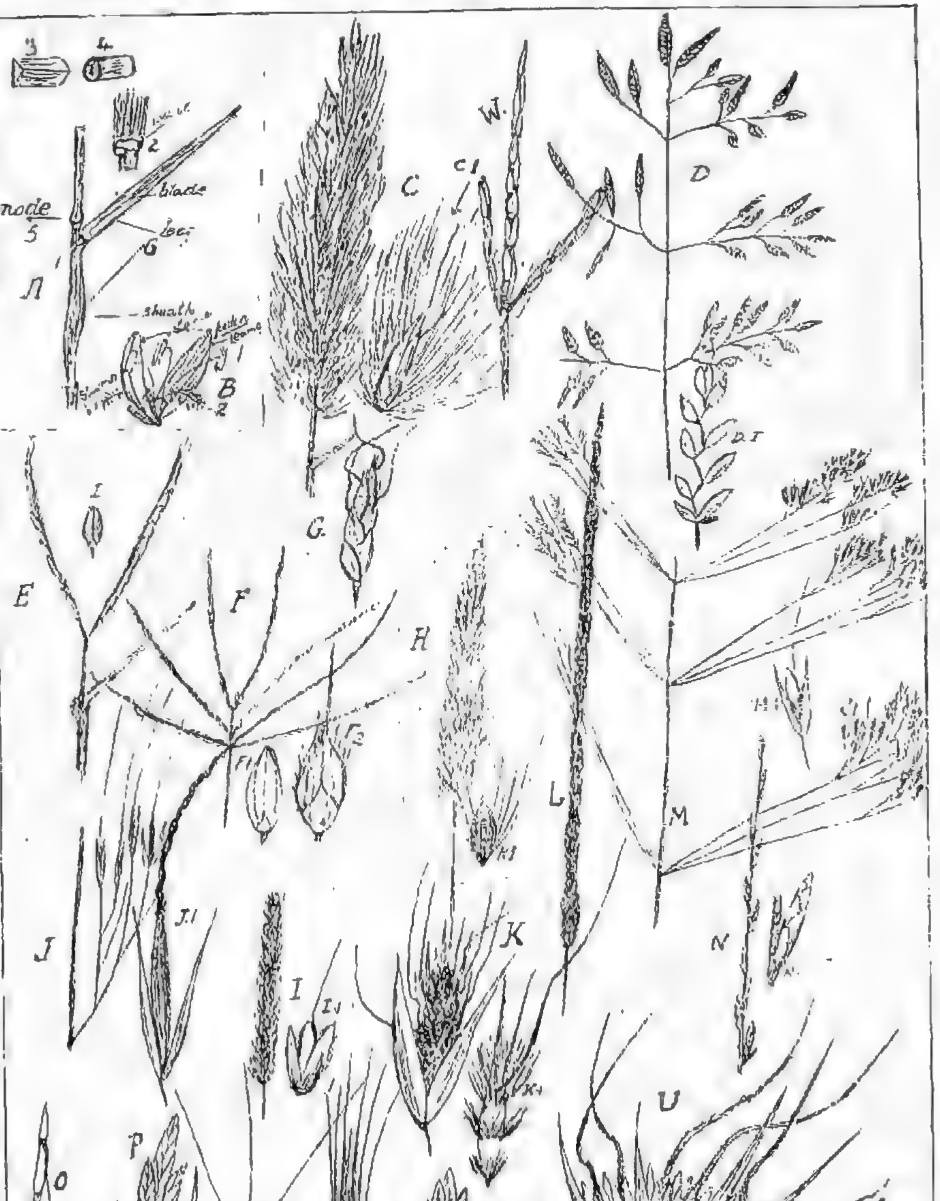
P. decompositum, R.Br. "Umbrella-Grass."

A quick-growing summer grass, with long divided panicle branches, somewhat like Fig. M. in habit, but spikelet like Fig. F.1, with the lowest glume truncate, barely one-third the length of the spikelet, three-nerved.

P. prolutum, F. v. M. "Pallied Panic Grass."

A rigid, glabrous perennial, somewhat like Fig. 4, but the spikelet as in Fig. 1, with the lowest glume half as long as spikelet. Grows in damp places.

P. sanguinale, L. "Summer-Grass."


3
4
2
node
5
blade
lig
G
A
sheath
B
J
1
2
C
C1
W.
D
D1
E
I
F
F1
F2
G.
H
H1
L
M
N
J
J1
I
I1
K
K1
U
O
1
2
P
Q
R
S
S1
T
V
V1
Floret
Glume

A cosmopolitan native grass, with panicle branches simple, spike-like—somewhat resembling a hand. Plentiful in gardens during the summer months, and is often known to gardeners as Yan Yean Grass, as it appears about the time when gardens need watering. Fig. F. and F.1.

Oplismenus compositus, Beauv. "Creeping Beard-Grass." Glumes four, outer glume with a long awn. Closely allied to *Panicum*.

A weak grass, very hairy, stems creeping, sometimes ascending to 1 ft. high.

SETARIA (Fig. H.).

(Latin, seta, a bristle.)

S. glauca, L. "Pale Pigeon-Grass." Spikes rather short and dense, flowering glume strongly rugose or marked. See Fig. H.1.

S. viridis, Beauv. "Green Pigeon-Grass." Similar to above, but with a smooth flowering glume.

S. macrostachya, H.B. and K. "Bearded Pigeon-Grass." Spikes longer than in the two above species, seemingly whorled, teeth of bristles erect. Fig. H.1 (part).

S. verticillata, Beauv. "Whorled Pigeon-Grass." Similar to above, but with whorled teeth on bristles, subtending the spikelet.

Spinifex hirsutus, Lab. "Hairy Spinifex."

Leaves long and silvery. Flower heads, male and female on separate plants. The male head spike-like, the female or fertile head semi-globular, 3 inches or more across, somewhat like a giant "Kangaroo-Grass." Fig. U., but very silky.

A large, hairy grass, with perennial creeping stem. In sand along the coast.

Microlaena stipoides, R.Br. "Weeping-Grass." (Mikros, Greek, small; alina, a cloak), in reference to the two small outer glumes.)

A perennial grass with weeping habit, 1 to 2 feet in height. Spikelet one-flowered, first and second glumes minute, unequal, persistent. Fig. T.

TETRARRHENA.

T. juncea, R.Br. "Wire-Grass."

A scrambling grass that climbs over bushes to a height of 8 feet to 12 feet. Common in Dandenong Ranges, etc.

Glumes, 6; third glume nearly as long as fourth and fifth; outer glumes obtuse, unequal.

T. distichophylla, R.Br. "Hairy Rice-Grass."

Stems arising from a creeping base to 1 ft.; rigid but slender.

T. acuminata. "Pointed Rice-Grass." Stems long and slender. Leaves long and broader than "Hairy Rice-Grass." Spike 1 to 1½ inches long. Large glumes acutely acuminate.

STIPA, L. Fig. J.

(From Greek, stype, tow, alluding to the fibre.)

S. flavescens, Labill. "Pale Spear-Grass." Ligule ciliate, outer glumes straw coloured, acute under ⅓ inch long,. 1½ to 3 feet high glabrous, the lower leaves slightly hairy. Awn 2 inches long.

S. Muelleri, Tate. "Wiry Spear-Grass."

Spikelets in a short racemes, ligule long, glabrous. Leaves few, almost absent. Awn minutely pubescent, 2 to 2½ inches long.

S. pubescens, R.Br. "Tall Spear-Grass."

A variable grass, with either glabrous (var. *semiglabra*, Reader.) or pubescent leaves. Grows to a height of 3 feet or more, but varies. Panicle loose, outer glumes of spikelet green and purplish; awn 1½ to 2 inches long, slender, with two bends.

S. setacea, R.Br. "Corkscrew-Grass." Flowering glume silky-hairy, nodes minutely pubescent, awn slender, 2 inches long, twisted. Sheath bearded.

S. semibarbata, R.Br. "Fibrous Spear-Grass," Awn stout, hairy, half way up.

S. scabra, Lindl. "Rough Spear-Grass." 1 to 2 feet high, leaves short, panicle loose, 6 inches to 1 foot long, with long spreading glabrous branches. Distinguished from the former by short fine ligule. from pubescens by the more slender habit.

S. teretifolia, Steud. "Coast Spear-Grass."

Alopecurus geniculatus, L. "Marsh Foxtail." (Alopex, a fox, oura, a tail, Greek.)

A cosmopolitan native grass, which grows in wet ground. Fig. I.

SPOROBOLUS, R.Br.

(Sporos, a seed, bolos, throwing.)

S. indicus, R.Br. "Rat-Tail-Grass."

A tussocky fibrous grass, 1½ to 2½ feet. Fig. L.

S. virginicus, Kunth. "Coast Rat-Tail-Grass." Spikelet one-flowered, as in former, but differs in having the second glume shorter than flowering glume. Panicle spike-like, lead-coloured, ¾ to 2½ inches long.

AGROSTIS, L.

A. scabra, Willd. "Rough Bent-Grass." Panicle spreading, spikelet-like, Fig. M.1, but with no awn. 6 inches to 1 foot high. Outer glume rather acute.

A. venusta, Trin. "Graceful Bent-Grass." Outer glume very acute, one line long—the former is ¾ line long, with larger leaves.

CALAMAGROSTIS.

Differs from *Agrostis* in the presence of a conspicuous tuft of hairs at the base of the flowering glume, together with a bristle arising from the back of the palea. (Fig. M.1.)

C. filiformis, Pilger. "Blown Grass." Fig. M. and M.1. Panicle loose.

A tumble-grass, which is blown or rolled along by the wind.

C. quadriseta, Spr. "Reed Bent-Grass." Panicle not loose, but spike-like; awn almost basal.

C. minor, J.M.B. "Smaller Bent-Grass." Bristle absent.

DICHELACHNE.

D. crinita, Hk.f. "Long-Hair Plume-Grass," and *D. sciurea,* Hk.f. "Short-Hair Plume-Grass." Perennial grasses resembling *Stipa* in habit. In Stipa the awn is terminal, in *Dichelachne* the awn is dorsal near the summit of the glume. *D. sciurea* differs from *D. crinita* in having a shorter and less conspicuous awn.

Amphibromus nervosus, Hk.f. "Swamp Wallaby-Grass." See Fig. G.

DANTHONIA.

(Danthoine, French botanist.)

Spikelets, several flowered, with a hairy callus at base. Outer glumes, two. Very variable perennial grasses.

D. penicillata, F. v. M. "Wallaby-Grass." 5 inches to 4 feet high, awn or flower much longer than lobes, Fig. K.1.

Numerous varieties. Needs revision.

D. carphoides, F. v. M. "Short Bandicoot-Grass."

A short grass, differing from the former in size, and having the lobes and awn of equal length, or nearly so.

Phragmites communis, Trin. "Common Reed."

A large bamboo-like grass that grows along creeks, swamps, etc. 5 to 6 feet; leaves 1 inch broad. The large inflorescence silvery.

Diplachne loliiformis, F. v. M. "Rye Beetle-Grass." Fig. N.

Eragrostis Brownii. "Common Love-Grass." D.1. Spikelets several-flowered, lead coloured, glumes nerved, panicle loose or spreading, leaves narrow, bearded behind the ligule. Fig. D. is a composite of the genus.

Distichlis spicata, Greene. "Salt-Grass." Seaside. Fig. 1.

Poa caespitosa, Forst. "Tussock-Grass." Fig. S.

A tall, variable perennial grass, growing in tussocks. Spikelet Fig. S., and habit of inflorescence S.1.

GLYCERIA.

Differs from *Poa* in having flowering glumes round on back, the lateral nerves straight and not converging on the central nerve, and branched stigma hairs.

G. dives. "Giant Mountain-Grass." A stout, erect glabrous grass, attaining a height of 5 to 12 feet. Leaves flat and long. Panicle loose and spreading, 6 inches to 1 foot long.

Wet, shaded gullies of Victoria.

FESTUCA. Fig. V. and V.1.

Spikelets several-flowered, paniculate, glumes generally acute or tapering into an awn.

F. duriuscula, L. "Hard or Sheep's-Fescue."

A perennial, with short thin leaves, mostly basal, much shorter than stems. Flowering glume faintly five-nerved, tapering to an awn about half its length.

F. littoralis, Labill. "Coast-Fescue."

A perennial with rigid leaves as long as stems, leaves cylindrical, as also has the former. See Fig. V.

LEPTURUS. (Fig. O.)

(Leptos, slender, oura, tail, Greek.)

L. incurvatus, Trin. "*Coast Barb-Grass.*" Spikes cylindrical, curved, outer glumes two. Fig. O.1.

L. cylindricus, Trin. "Common Barb-Grass." Similar to above, but spikes thicker and usually straight, and has but one outer glume. Fig. O. and O.2.

Agropyrum scabrum, L. "Common Wheat-Grass." (Agros, a field, pyros, wheat.)

A very variable perennial plant, 1 to 4 feet high, leaves scabrous on the edges. Spikelets distant 6 to 12 flowered, flowering glumes narrow, rigid. See Fig. R.

STRAY NOTES ON STONE-FLIES.

BY CHARLES BARRETT.

Until Dr. R. J. Tillyard began to study the Order Perlaria, little was known regarding our stone-flies. We were ignorant of the fact that the most remarkable, perhaps, of all the described species, existed in Victoria, though a specimen, taken at Warburton many years ago, was in the National Museum collection. My interest in these aquatic insects dates from the time when I found several examples of *Eustheniopsis venosa*, crawling over a muddy road, at Monbulk. I sent them to Dr. Tillyard, who told me about the wonderful *Thaumatoperla robusta*, Till, which was known only by one female specimen.

A search along the Yarra at Warburton, the type locality, was unsuccessful; but later, on the Dee River, Millgrove, Mr. F. E. Wilson and Mr. Tom Tregellas obtained three specimens of the female. The male was discovered almost by chance, though I had been searching for it keenly on that stormy day. As Mr. Tregellas and I came down the steep timber-haulage track, in driving rain, we nearly stepped upon a stone-fly, resting in the mud. I collected it, quite unaware that I had a prize, the male of *Thaumatoperla!* It was duly sent to Dr. Tillyard, who figured and described it. No other specimen has yet been obtained; but Mr. Wilson discovered larvae of the species crawling on bits of rotting wood in the Dee.

T. robusta, apparently, is a rare insect; since we have visited Millgrove many times, looking for it always, and the net result is, one male and three female specimens.

Thaumatoperla is a large stone-fly; which cannot be mistaken for any other species. The wings are black and very broad; the pronotum is orange colored.

It was in April, 1920, that Dr. Tillyard, when going through the National Museum collections, discovered "a magnificent new stone-fly, quite unlike anything hitherto known." It was loaned to him for study, and he was thus able to show it to many entomologists in England and the United States. It belongs to the family, *Eustheniidae*, within which it was placed by Dr. Tillyard, "as the sole representative of a new genus, *Thaumatoperla*, forming the only known member of a new subfamily, *Thaumatoperlinae*."

All the Millgrove specimens of *T. robusta* were obtained on the tram track, at about 2,500 feet; the larvae, also, were found in the stream at that elevation. *Thaumatoperla* is a dweller in high places; and stone-flies generally are to be looked for in the mountains. Our most abundant species, *E. venosa*, I have taken on fern fronds at Belgrave, and on ferns and waterside shrubs and grasses at Sassafras and Monbulk. Nearly a dozen examples were collected in July, on track or road in the Monbulk district. This species has been observed in Spring, and very rarely, in early Summer, while Mr. Wilson took his specimens of *T. robusta* in January and April respectively.

"Generally speaking," Dr. Tillyard informed me, "you may follow this rule, for these insects (stone-flies)—at high altitudes or in cold climates, October to January; moderately warm to warm climates, i.e., up to about Sydney, only July to September; tropics, absent, except at high elevations. Larvae can be got at any time of year, but most full-fed forms occur just before imagines hatch out."

Southern Victoria, Dr. Tillyard states, may be regarded as the headquarters of the family, *Eustheniidae*, for all three sub-families are represented in our ranges. I have taken examples of four species, all along the banks of, or close to, mountain streams. Several specimens of a small and slender stone-fly, with grey, mottled wings, were discovered, resting side by side, under a bit of loose bark on a gum tree.

Stone-flies, as a rule, are sluggish insects; they fly little, and, those species I have observed, in a curious, fluttering manner. But they are capable of fairly swift and high flight; one *E. venosa* which I disturbed, rose slantingly about 40 feet to the branch of a tree. Many I have beaten from herbage along creek or river side; occasionally one has been seen resting upon a stone, in or near the water.

Stone-fly larvae are abundant in our mountain streams; and larval exuviae may be seen attached to plant stems along the banks, to dry stones, bridge piles, etc.; yet the imagines are not familiar objects. A member of our Club asked me recently, "What *is* a stone-fly?" He had never seen one of these remarkable insects. I am rather confident that further searching will be rewarded; that undescribed species of stone-flies will be found in southern Victoria. Here is another promising field for the young entomologist who desires to garner ungarnered grain, rather than work where already many others have gleaned.

The Orchids of Victoria

BY EDWARD E. PESCOTT, F.L.S., F.R.H.S.

PART V.

8. CORYSANTHES, R.Br.

("Helmet Flower.")

Plant dwarf; leaf single, ovate, cordate or oval; flower solitary, dorsal sepal erect, incurved, hood or helmet shaped; lateral sepals and petals small, often diminutive, linear. Labellum large, tubular, base erect enclosing the column. Column short, erect, fleshy, sometimes winged. Pedicel (flower stem) frequently much elongated when fruiting.

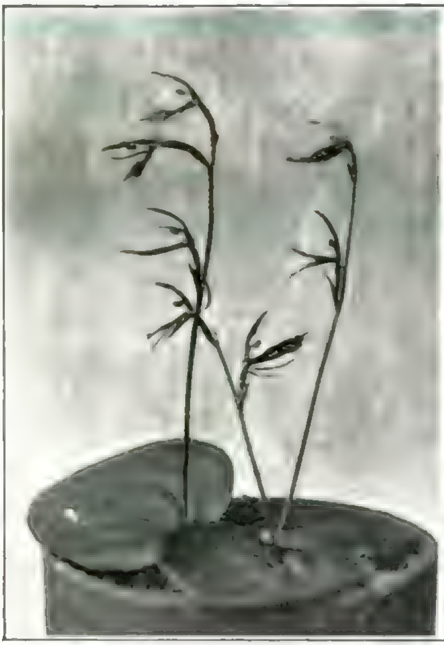
I have preferred to retain Brown's name of "*Corysanthes,*" instead of Salisbury's prior name, "*Corybas,*" following the opinion of British botanists. Schlecter has recently restored Salisbury's name of "*Corybas,*" but his example is not being readily followed. It is admitted that Salisbury has claim to priority, but it is well known that he had seen Brown's descriptions or specimens, Bentham remarking that the name "*Corybas*" was "universally rejected as having been surreptitiously figured and described." Salisbury had access to a drawing by Bauer, and so he named and described the original species. British botanists still follow Bentham's lead in refusing to recognise "Corybas."

This is an extensive genus, ranging from the Philippines, the Himalayas, through the islands to Papua, Polynesia, New Zealand and Australia. There are five Australian species, of which four occur in Victoria. The single leaf is usually placed flat on the ground, with the flower rarely raised above it, the pedicel being usually very short. The colour is usually purplish; while the large inflated sometimes whitish labellum, and the large helmet shaped dorsal sepal, hooded over the labellum are quite characteristic in all the species.

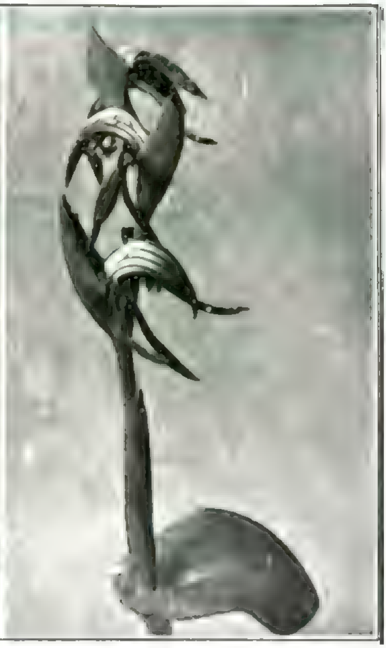
1. C. UNGUICULATA, R.Br. (clawed, referring to the base of the dorsal sepal.) "Small Helmet-orchid."

Plant *very dwarf;* leaf ovate-cordate, sometimes 3 lobed; reddish streaked underneath. Ovary rather long. Dorsal sepal *abruptly contracted into a narrow, linear claw,* claw erect at base, then much incurved. Lateral sepals colorless, narrow linear, petals much shorter.

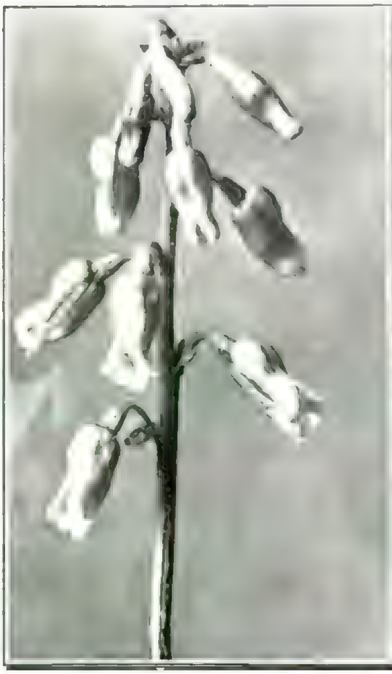
Plate XV.



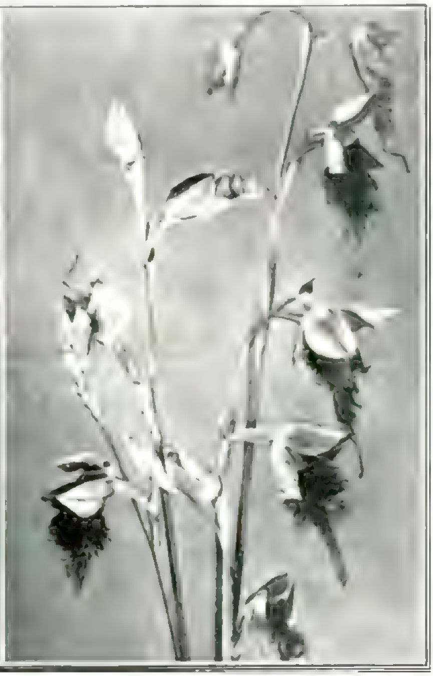
Cyrtostylis reniformis, R.Br.
"Gnat-Orchid."



Lyperanthus nigricans, R.Br.
"Red-Beak Orchid."



Gastrodia sesamoides, R.Br.
"Potato-Orchid."



Calochilus campestris, R.Br.
"Peaked Beard Orchid."

spreading. Labellum longer than the dorsal sepal, tubular, inflated in the middle, and diminishing towards the base; margins of the orifice entire; a long row of calli extending from the orifice along the middle of the lamina to the base. Column very short, incurved, two winged.

This diminutive species is not often half an inch in size; being very small, it may have often been passed by. It flowers in July, and is very rare. It is often found growing at the base of *Melaleuca ericifolia*. It is known at Healesville, Fernshawe, Oakleigh and South Gippsland. It is also recorded from New South Wales, South Australia, and Tasmania.

2. C. FIMBRIATA, R.Br. (fringed—i.e., the labellum.) "Fringed Helmet-orchid."

Plant small; leaf round, cordate, pointed. Flower reddish-purple, almost sessile, ovary terete, rather long. Dorsal sepal erect, and then incurved, gradually contracted to a claw, lamina forming a hood over and beyond the labellum. Lateral sepals colorless, linear; connate at their bases with each other and with the petals. Petals somewhat wider and shorter, colorless, often bidentate. Labellum large, sessile, deep crimson, lower half vertical against the dorsal sepal, enclosing the column in a split tube: upper part acutely recurved, expanded into an orifice with *denticulate margins* and directed forward. Tube at base dilated at each side of attachment into a wide auricle. Column short, not winged.

3. C. PRUINOSA, R.Cunn. ("bloom," i.e., a coating or covering, referring to greyish colour of dorsal sepal.) "Large Helmet-orchid."

Flower smaller than Species 2, having a narrower, shorter, or less obtuse hood, not projecting beyond front of labellum. Orifice of labellum *not or scarcely fimbriate,* usually having entire incurved margins.

These two species (2 and 3) are doubtfully distinct. Botanists agree that the principal difference between the two is the absence of fringe or fimbriations on the labellum of *C. pruinosa*. *C. fimbriata* was the first described. The plants are found in colonies, often among tea tree, in fern gullies and other shaded places. Occasionally they will be found growing in abundance on the trunks of tree ferns, notably *Dicksonia antarctica*. They flower in winter and early spring.

Recorded from the South, East and North East; also from all parts of the Commonwealth except the Northern Territory.

It is often difficult to separate the two species, as they frequently grow intermingled.

4. C. BICALCARATA, R.Br. (two-spurred; referring to the basal auricles of the labellum.) "Spurred Helmet-orchid."

Plant small, leaf orbicular-cordate, reddish beneath, larger and thinner than species 2, somewhat membranous. Ovary long, cylindrical. Dorsal sepal much incurved, not contracted at base. Lateral sepals and petals very small, *often almost absent.* Labellum small, the tubular base tapering to *two white narrow conical spurs,* between which are the minute lateral sepals: Column wings narrow.

This uncommon species, easily distinguishable by the white spurs and very small sepals, is only known from Healesville, where it flowers in winter and spring. It also occurs in Queensland, New South Wales and Tasmania.

9. ACIANTHUS, R.Br.

(Pointed flower.)

Plants dwarf; leaf solitary; one flower stem; several flowers on stem. Dorsal sepal erect or incurved over the column, concave, not very broad, and *often produced to a fine point;* lateral sepals narrow, erect or spreading; petals much shorter. Labellum sessile, as long as the petals, undivided, margin entire; with two basal calli or tubercles. Column semi-terete, not usually winged. Anther broad, erect, two celled with valves.

Terrestrial glabrous herbs, with small underground tubers. Leaf broadly cordate, entire, lobed, or deeply dissected. Flowers usually in a terminal raceme; sometimes solitary, generally several.

There are about 18 species in the genus, mostly occurring in New Caledonia. One comes from New Zealand, and five are recorded from Australia, two of which are Victorian.

These dwarf and almost inconspicuous orchids are usually found in cooler districts, and very often in forest or moor land.

1. A. CAUDATUS, R.Br. (tailed, referring to the long dorsal sepal.) "Mayfly-orchid."

Stems slender, glabrous, 3 to 6 inches high. Leaf radical or nearly so; cordate ovate, quite thin, margins often crenate, sometimes lobed, green above *reddish or purplish below.* Flowers 1 to 4 crimson or purplish crimson, pedicels short. Dorsal sepal dilated over the anther, then *tapering to a long filiform point,* often over 1 inch in length. Lateral sepals free, tapering to fine points. Petals falcate, lanceolate, quite short. Labellum sessile, crimson, margins entire; lamina glandular with smooth surface, having two triangular calli at the base.

This small but handsome species is often found in colonies in open forest or moor land, not usually occurring in exposed places. It is easily noticed for its slender form, with the long tailed sepals, the flowers all grouped at the top of the stem. It occurs also in New South Wales, South Australia and Tasmania.

Flowers in September and October, and recorded from the South and East.

2. A. EXSERTUS, R.Br. (protruded, referring to the bending forward of the column.) "Mosquito-orchid."

Stems stouter than the preceding species, usually taller, often growing to 6 to 9 inches high. Leaf single, sessile, ovate-cordate, green above, *red below,* margins entire. Flowers 3 to 12, but occasionally found up to 20 or more; flowers reddish green, or greenish purple, quite small, pedicels short. Dorsal sepal, quite short, slightly incurved, concave, ovate, lanceolate, pointed. *Lateral sepals almost as long,* free, spreading beneath the labellum. Petals lanceolate, about half as long as the sepals. Labellum peltate, on a distinct claw, upper surface convex, densely tuberculate, except near the base. Column quite conspicuous, almost as long as the petals, widely winged.

This is more common and more conspicuous than the former species, occurring in more open land and growing under harder conditions. The flowers occur in a tall raceme, and are not always placed at the top of the stem.

This species occurs in all States of the Commonwealth, and is recorded from all parts of this State. It flowers from May to August.

10. CRYTOSTYLIS, R.Br.

(Curved column.)

Plant dwarf; leaf solitary. Dorsal sepal narrow, lanceolate, incurved, concave. Lateral sepals and petals narrow, spreading, nearly equal in length, to the dorsal sepal, or petals a little shorter. Labellum sessile, flat, undivided, entire, with two calli at the base *produced into raised lines along the lamina.* Column elongated, incurved, winged in the upper part.

Terrestrial glabrous herbs. Leaf sessile at base of stem, usually green on both pages. Stems bearing a raceme of several flowers.

There are only two known species in the genus, one in Australia and one in New Zealand.

1. C. RENIFORMIS, R.Br. (kidney shaped, referring to the leaf). "Gnat-orchid."

Plant small; leaf solitary, *orbicular-cordate*, without point, *green on both pages.* Flowers from 3-6, occasionally found solitary. Dorsal sepal somewhat long triangular shaped; lateral sepals and petals narrow. Labellum as long as the dorsal sepal, and conspicuously wide.

This species is easily recognized by its green, heart-shaped leaf, somewhat firm in consistence. The labellum is quite conspicuous. It is found in every State of the Commonwealth, and in all but the N.W. in Victoria. Flowers in July-August.

11. LYPERANTHUS, R.Br.

(Mournful flower, referring to the gloomy colour.)

Dorsal sepal broad, erect, or incurved over the column: lateral sepals and petals narrow, all nearly equal in length. Labellum shorter than the sepals, undivided or three lobed: lamina sometimes bearing raised lines, surface of lamina or middle lobe papillose (covered with soft superficial glands). Column erect, incurved, more or less winged, as long or nearly as long as the labellum.

Terrestrial glabrous herbs, with small underground tubers, leaves 1-3, usually thick; bracts often leaf like. The plants usually dry quite black.

There are about a dozen species in the genus, which extends to New Zealand and New Caledonia. Five species are endemic to Australia, two being recorded from Victoria. One species, *L. suaveolens*, was formerly placed in *Caladenia;* while *Burnettia cuneata* was formerly referred to *Lyperanthus.*

1. L. NIGRICANS, R.Br. (blackish or becoming black, when dry). "Red-beak Orchid."

A stout plant, from a few inches to a foot in height. Radical leaf broadly ovate-cordate or orbicular- cordate, fleshy, thick; stem bracts usually two, sheathing the stem, blunt, leaf like. Flowers large, 2 to 8, usually about 4, purple or with dark crimson purple stripes, ovary and pedicel included in an enveloping bract. Dorsal sepal usually white or pinkish white, with purplish or crimson stripes, much incurved, broadly lanceolate. Lateral sepals spreading, linear, free; petals similar, spreading. Labellum, light coloured, with purplish veins and dark tip, sessile, obovate, three lobed; lateral lobes erect, clasping the column, the middle one with rather blunt tip, *fringed or deeply denticulate.* Lamina with a wide smooth raised line or band between the lateral lobes. Column erect, then incurved, narrowly winged.

This plant, formerly known as "The Undertaker," on account of turning black when dried, is found in open moor or hill country. It is often reputed to flower only after a bush fire. But while it often does flower after fires, it does not depend on fires alone to stimulate it into flowering. In Western Australia, it is much more robust than in Victoria, there growing quite tall. Here it is rather a dwarf plant.

It is recorded from all States except Queensland; and from all parts of Victoria except the N.E. It flowers in September-October.

2. L. SUAVEOLENS, R.Br. (sweet-scented). "Brownbeaks."

A glabrous plant, from 12 to 18 inches in height. Leaf of thick consistency, linear or linear-lanceolate, channelled, 6 to 12 inches long; two or three sheathing scale leaves on stem. Flowers 2-8, rarely more, almost sessile, with bract sheathing the ovary. Dorsal sepal lanceolate, acuminate incurved, concave, often one inch in length; lateral sepals and petals almost of equal length, linear, spreading. Sepals and petals all dull purplish in colour. Labellum much shorter than sepals, the erect part broad, with not prominent lateral lobes. Calli in two rows along the claw or erect part and between the lateral lobes; the disc covered with small calli arranged in several rows. Column broadly winged.

This tall orchid is found in bush land, but is often hard to find on account of its inconspicuous dull colour. It is not always sweetly scented, as its name implies, although the fragrance is very sweet in hot, moist weather.

It is recorded also from Tasmania and New South Wales; and has been found in the S., N.E., and E. in this State. It flowers in September-October.

12. BURNETTIA, Lindl.

(After Burnett.)

Sepals and petals nearly equal, erect or connivent, dorsal sepal incurved and concave, lateral sepals and petals falcate. Labellum shorter than the sepals, undivided, sessile, erect at base, recurved at the end, with *two longitudinal raised plates along the centre* broken up into calli above the middle. Column erect, incurved, winged. Anther erect, two celled.

Terrestrial herbs, leafless at flowering time, except for a few sheathing scales. Leaf solitary. Flowers few in terminal head.

This genus differs from Caladenia in its habit, and particularly in having the longitudinal plates on the labellum. It is limited to a single species, which is found only in Victoria and Tasmania.

1. B. CUNEATA, Lindl. (Cuneate, wedge-shaped leaf.) "Lizard-orchid."

Leaf absent at flowering; stems 2 to 4 inches high, having two or three fleshy bracts. Flowers one to three, erect, much incurved, usually brownish red outside, but rarely white; white inside; stem brownish. Sepals and petals of thick consistency. Labellum shorter than the petals, broad, ending abruptly.

This is a rare species, and is only recorded from the South, in this State. Its appearance can be noted from the coloured plate. It usually hides itself in dense scrub, and almost invariably in peaty land amongst *Melaleuca squarrosa,* the "Scented Paper bark" tea tree. It flowers in September-October.

13. ERIOCHILUS, R.Br.

(Woolly-lip.)

Dorsal sepal erect, slightly incurved and concave; lateral sepals longer, spreading, elliptical, contracted into narrow distinct stipes (stalks); petals nearly as long as dorsal sepal, usually narrower, erect and spreading. Labellum sessile, much shorter, on a long erect narrow-oblong base, the margins often produced into erect lateral lobes: the lamina or middle lobe recurved, very convex, entire, the surface glandular-villous. Column erect, elongate, narrowly winged.

Terrestrial herbs, glandular pubescent or hairy, rarely glabrous. Leaf glabrous, solitary, ovate or lanceolate. Flowers pink or white, one or two on stem, rarely 3-5.

The genus is endemic to Australia, having five species, four occurring in West Australia.

1. E. AUTUMNALIS, R.Br. (autumn flowering). "Parson's Bands."

A slender plant, upwards of 6 inches in height; leaf solitary, radical, ovate, small at flowering time, increasing afterwards. Flowers one to three, usually white, occasionally pink and white. Dorsal sepal erect, long, green or greenish brown; lateral sepals, elliptical lanceolate, white. Petals erect, linear falcate. Labellum about as long as the petals, the erect part glabrous, the recurved part much wider, ovate with transverse ridges of reddish hairs. Column with narrow wings behind the stigma, shorter than the dorsal sepal.

This low growing autumn-flowering orchid is conspicuous in open grass lands, on account of the two spreading white petals, which have given to it the vernacular, "Parson's Bands." Under the glass, the labellum presents a very beautiful appearance, and is well worth study. The flowers come in April-May, and are usually sweetly fragrant.

The species occurs from Queensland to South Australia and Tasmania; and is recorded from all parts of Victoria.

14. LEPTOCERAS, Lindl.

(Thin horn, referring to the petals.)

Dorsal sepal wide, concave, erect or incurved, contracted gradually towards the base: lateral sepals about equal in length, acute, very narrow, deflexed against the ovary. *Petals* longer, *erect*, linear clavate (*clubbed*), *the clubbed part very glandular.* Labellum on a short movable claw, *much wider than long*, three lobed: lateral lobes large, dome shaped, fringed or deeply combed, with pubescent (hairy) spots on the upper convex surface: middle lobe much smaller, rounded, less deeply combed, upper surface smooth or nearly so. Column incurved, rather widely winged.

Terrestrial glabrous herbs. Leaf basal, solitary, sessile, sheathing, ovate, oblong, or broadly lanceolate, often small at flowering, increasing in size afterwards.

The genus includes one species only, endemic to Australia. Rogers records it as closely allied to *Caladenia Menziesii,* and to the genus *Eriochilus.*

1. L. FIMBRIATUM, Lindl. (fringed, i.e., the labellum) "Fringed Hare-orchid."

(Included by Bentham and other botanists under Caladenia). Glabrous or nearly so; slender stems up to 8 inches high. Flowers one to three, reddish or yellowish-brown, on slender pedicels. Petals longer than the other segments. Labellum greenish with red-brown pubescent spots.

This handsome orchid, usually found growing in colonies, is readily recognized by its very broad, deeply fringed labellum, and by the two upstanding, erect petals. It flowers in autumn and winter, and is also recorded from Western Australia and South Australia. In Victoria it only occurs in the South. There it usually grows in open grass, or moor lands, near the coast.

RECORDS OF ORCHIDS.

Mr. J. C. Goudie's note in the December *Naturalist,* is very interesting. I was quite correct in saying that *Thelymitra aristata,* Lindl. is "recorded from all districts but the north-west." A plant may be collected and not recorded; this orchid certainly had not been placed on our records from the N.W. Plant collectors everywhere are urged to advise the Club officers of their records and collections, so that our Census shall be as complete as possible. Mr. Goudie's interesting list contains another species not hitherto recorded from that district, *Caladenia carnea.* These records will be noted by the Plant Names Committee. Regarding *Caladenia tentaculata,* Dr. R. S. Rogers, now places this as a variety of *C. filamentosa,* R.Br.—E. E. PESCOTT.

A farmer friend of mine relates the following incident, which shows how confiding the Black and White Fantail, *Rhipidura leucophrys,* can be. The farmer's light-pole wagon had been standing in the stockyard, unused for some time, when he required it for a trip to Murtoa. When half way home, four miles, he stopped, and alighted to re-arrange portion of the load. A wagtail appeared, and showed signs that his presence was unwelcome. He stood aside, whereupon the bird flew beneath the wagon, on to its nest, which was built on the fetchels. The farmer continued his journey, and on arrival, placed the wagon in its old position in the stockyard, where it remained undisturbed until the wagtail brood had ranged from the nest.—JAMES HILL, Murtoa.

"Bird Study in India" (Oxford University Press, London), is the title of a small book by Miss M. R. N. Holmer, M.A., F.Z.S., which is at once an introduction to ornithology, and a concise guide to the birds of India. It is pleasantly written and attractively illustrated. The author is obviously a true bird observer, and well versed in her subject. A volume of this kind dealing with Victorian birds, would be welcomed by a host of nature-lovers.

EXCURSIONS

MILLGROVE.—On November 30th, we journeyed to Millgrove, in perfect summer weather. An ideal camping spot was chosen on the banks of the Yarra, close to the station. We enjoyed the beautiful picture of the river racing down its rocky bed with the huge gums and blackwoods on its banks, supported by wattles and tea-tree, with smaller creepers and shrubs adding their quota to the scene. Many Striated Thornbills were noted among high branches, and Grey Fantails were busy nearer to us, and more friendly. We found a nest, containing young, of the latter species.

Walking towards Warburton we explored the left bank of the stream, then, recrossing the bridge and following the road for about a mile, once more came down to the river, and followed it to the town. Just before leaving the road we passed an old homestead with magnificent specimens of English Elms, and a grand old English Oak tree. Nearly 40 species of native plants were collected.—M. R. WIGAN.

SYDENHAM AND BULLA.—Two char-a-bancs carried 39 members to Sydenham, on November 13th. On the way we observed the characteristic lava plain, sloping gently from the hills to the sea and cut by streams which are young in the characters of their banks, and old in their sinuous courses. The Organ Pipes were inspected. About half the number present then returned to the cars and went round to Bulla by road.

The remainder of the party, with the leader, went across country to the Entrenched Meander, near Bulla, where they inspected a granodiorite contact and the adjacent metamorphism. A block showing the plutonic rock moulded on to the hornfels, was found.

Any one who so desires can go over the ground, with a copy of the *Victorian Naturalist* of July, 1911, in hand. This number contains an excellent report by Mr. R. W. Armitage and others, of an excursion led that year through the same and neighbouring localities.—A. L. SCOTT.

YAN YEAN.—Nine members and friends attended the excursion to Yan Yean on December 11th. Bush flies welcomed us and were in constant attendance during the day. After a pleasant walk of about a mile the Reserve was entered, and, passing over a low hill, thickly covered with native vegetation, mainly Casuarinas, we reached the southern shore of the lake. The track along the waterside was followed for a mile. We noted some flowering plants of Salsify and numerous seedling native pines (*Callitris*). In the pine avenue the small black and yellow Cicadas were found in all stages of emergence, from the climbing nymph to the imago. Among the Eucalypts the large dark-colored species was plentiful. At this spot we searched the outcropping Silurian strata for fossils and some impressions of bivalve shells were obtained.

Retracing our steps, we examined the outflow system of the reservoir, and followed the embankment and shore line on the western side. Few birds were seen. The open water was occupied only by a dozen Musk Ducks, but with the aid of binoculars, a flock of Black Cormorants and some Black Swans were seen near the further shore. Other birds noted were Silver Gull, White-backed Magpie, Black-faced Cuckoo Shrike, Rosellas and Red-backed Parrakeets, White-fronted Heron, Kookaburra, Dusky Wood Swallow, Grey Thrush, Pied Grallina, Rufous Whistler, Bronze Cuckoo (pursued by Yellow-tailed Thornbill), Black-and-White Fantail, and Blue Wren.—A. E. RODDA.

FRANK WISEWOULD.

The announcement, in the press on November 29th, of the death of Mr. Frank Wisewould, on the previous Saturday, came as a great shock to his many friends among the members of the Field Naturalists' Club, as only a few weeks before he had been one of the prominent workers at the Wildflower Show. Mr. Wisewould was an "original" member of the Club, having been one of those elected at the first meeting, in May, 1880. In February, 1923, he, with seven other members of equally long membership, was elected a life honorary member.

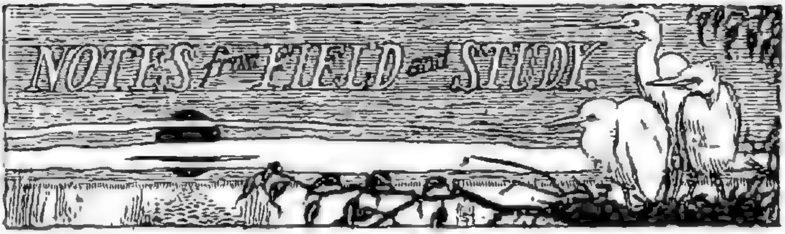
Though a regular attendant at Club meetings for many years, Mr. Wisewould contributed but one paper to the Club's proceedings, "Notes of a Visit to the Chudleigh (Mole Creek) Caves, Tasmania," (*Vict. Nat.*, Sept., 1885), but as the result of establishing a country home at Pakenham Upper, in later years, he often contributed bird notes at the meeting, and on several occasions acted as leader and host to Club excursion parties in his neighbourhood. He was always keenly interested in the Wildflower Shows, and besides helping in the Hall, contributed fine collections of blooms, chiefly from Pakenham.

Mr. Wisewould was President of the Club in 1910-11 and 1911-12, and occupied various positions on the Committee of management for a total period of 16 years. He was a man of sterling character, and in his position as a prominent solicitor of the city, filled many positions and made hosts of friends. His death was caused by an acute attack of appendicitis—singularly enough, appendicitis was also the cause of his father's death. He leaves a widow and one daughter (Dr. G. Wisewould, of St. Kilda). The Club was represented at his funeral to the Brighton Cemetery, by the President and a number of other members.

EXCURSION.

HEALESVILLE.—Eighteen members took part in the Club excursion to Healesville on Saturday, November 20th. We walked to Echo Tunnel and Donnelly's Weir. The following orchids were noted:—

Pterostylis pusilla, P. falcata, Microtis atrata, M. parviflora, M. porrifolia, M. oblonga, Calochilus cupreus, C. Robertsonii, C. paludosus, Thelymitra pauciflora, T. media, Prasophyllum Frenchii, P. odoratum, Gastrodia sesamoides, Dipodium punctatum (buds only).—MRS. E. COLEMAN.


NOTES from FIELD and STUDY.

HABIT OF CHILOGLOTTIS MUELLERI.

The orchid, *Chiloglottis Muelleri*, is rather terrestrial than an epiphyte, according to observations made by Mr. F. J. Bishop and myself, when we travelled across the Baw Baw plateau, December-January, 1923-4-5. We found this species growing on Mount Erica, beneath *Melaleuca* and other bushes; even among grass and between rocks, right out in the open. It was very abundant at 5,000 feet. In the morasses it is very robust, much larger in leaf than *C. Gunnii*, while the flower is as large. The day's journey across Mt. St. Phillack (5,140 feet) to Fall's Creek, 23 miles, revealed this orchid as terrestrial. On the Thomson River, in the fern gullies, it was noted in thousands (not hundreds). We made a special search of the tree-fern trunks, but did not discover one specimen on these. This species is also found in Tasmania, growing as a terrestrial.

P. Tadgellianum, Rogers. Bogong Leek-orchid. Mr. F. J. Bishop and myself, also the Rev. A. C. F. Gates, have recorded this species from the Baw Baw Plateau, where it is very plentiful. This was in 1923-24-25 and 26. Mr. Gates forwarded specimens to the Herbarium. At 5,000 feet and below that altitude, it is abundant from Mt. Erica to Mt. Whitelaw, a distance of about eight miles.—W. H. NICHOLLS.

THE ORIOLE.

For many years a grape-vine, which is trained against the east side of our house, has suffered from attacks of vine moth caterpillars. It has been stated, from time to time, that the Pallid Cuckoo (*Cuculus pallidus*) is the only bird which will destroy these caterpillars. The Cuckoo assuredly does good service in this respect as I have known the bird to clear a vine of them; but Cuckoos being rather scarce in this district—Sperm Whale Head—usually they are not at hand when needed. This season the caterpillars are as numerous as in previous years, and one day recently I observed two Orioles (*Oriolus sagittatus*) feasting on the pests; this diet appeared to be palatable. I was surprised to see the Orioles, as they are rare birds in the locality, seldom coming about the house; usually they are rather timid. The vine is opposite a window, and evidently one of the birds was deceived by its own reflection in the glass, as it darted straight at the window and sustained a sharp knock. Wattle-birds frequently hunt for food around the gardens, but they do not fancy vine moth caterpillars, preferring the smaller ones to be found among the vegetables. I am hoping that the wattle-birds will permit the Orioles to "make themselves at home."—FRED. BARTON, JNR.

FLORA OF SOUTH AUSTRALIA

Australian botanists and plant collectors will welcome the third instalment of Mr. J. M. Black's "Flora of South Australia," which has just been published by the South Australian Government as one of the series of handbooks issued by the British Science Guild (South Australian branch). When the book is completed by the publication of the fourth part, it will rank with the works of Mueller, Maiden, Bailey, and Rodway. This new part consists of 156 pages, embracing 33 families, Meliaceae to Scrophulariaceae, 540 species, and includes 18 species, 14 varieties, and 10 new combinations for which the author is responsible.

Regarding the nomenclature, Mr. Black has adopted combinations which he finds conform to the rules of the Vienna Conference of Botanists; for example, *Lhotzkya alpestris* for *L. genetylloides*, and *Daucus glochidiatus* for *D. brachiatus*. He is careful to show reasons for the changes, and to give dates where priority is in question. Our Plant Records Committee will doubtless consider the advisability of adopting the changes when publishing the next Supplement to the Census. These changes may be pronounced vexatious and unnecessary, but they are inevitable, and are justified by the evidence which Mr. Black has been able to bring forward.

The study of naturalised aliens is very important from an economic point of view, and the book is rendered much more useful by the inclusion of the descriptions and many drawings of the plants which have become naturalised in the sister State. Few vernacular names are given. Three-fifths of the plants enumerated are also Victorian species, and those who are responsible for the publication of the vernacular names in the Census of Victorian Plants, would like to have seen these names quoted in Mr. Black's book, which will be largely used by amateur botanists. In all books of this nature vernaculars should be given; they are as important, in their way, as scientific names, and were they generally used by authors, botany would become more popular.

BIRDLAND TRAGEDIES

Early in November, 1926, at Ashburton, a Magpie-lark, *Grallina cyanoleuca*, was sitting on a nest, 35 feet from the ground, in a tall gum sapling. At that time there were four eggs in the nest, but three days later the eggs were missing and the nest contained the decapitated body of a Goldfinch. The disappearance of the eggs was regarded as due to one of the bird-nesting parties that were then committing much destruction among birds in the district. On December 14th the headless body of an Indian Mynah was found in the nest; the bird had been dead only a few days. On the same afternoon a pair of Regent Honeyeaters, *Zanthomiza phrygia*, was observed, busily engaged feeding two young ones, in a nest 75 yards away. Next morning these nestlings were found dead in the nest; the head of one had been bitten off. The bodies of all were in a good state of preservation, and apparently the birds had been wantonly destroyed. The locality is seldom visited by hawks or falcons at this time of the year, but Boobook Owls and Frogmouths are not uncommon there.—D. DICKISON.

PROPERTIES OF LOMATIA FLOWERS

Lomatias, decorative Proteaceous plants, are in full bloom now (January) in our bush, and it is well to direct attention to an attribute possessed by these flowers, that is not generally known, seeing that surprise has been expressed that none of the species is placed on lists of honey-producing plants.

Some research work on the flowers of certain Proteaceae has been published in the *Proc. Roy. Soc., Queensland*, the authors being F. Smith, B.Sc., and C. T. White, F.L.S. One species, *Lomatia silaifolia*, which we grow in our gardens, was reported to possess properties which killed flies. Chemical tests were carried out, with the result that the anthers, style, and stigma gave strong positive reaction to hydrocyanic acid gas (H.C.N.). The foliage, petals, capsules, and seed all gave negative reaction, so that the poison is confined to the reproductive organs, which are regularly visited by bees. The authors of the paper conclude: "The possibility of *Lomatia* flowers proving dangerous to bees owing to the cyanophoric properties of the pollen seems to us worthy of consideration by entomologists and apiarists."

Flowers of the Silky Oak, *Grevillea robusta*, also were submitted to similar tests, and the pistil, capsules, and seed gave a strong positive reaction also to the H.C.N.—E. E. PESCOTT.

PARASITIC HYMENOPTERA.

For the student of parasitic Hymenoptera, more especially the Proctotrypoidea, Belgrave is a good hunting-ground. Mr. Alan P. Dodd, Officer in Charge of the Prickly Pear Investigation, Queensland, during Christmas holidays, visited the district, and he reports that he obtained a fine lot of material. Mr. Dodd specialises in the study of Diapriidae and Belytidæ, both of which families are well represented at Belgrave. These minute insects are parasitic on Dipterous larvae. They are collected mainly by use of the sweeping-net.

Several species in the family Ceraphronidae, also Dipterous parasites, were taken by Mr. Dodd; and one species in the small family Proctotrypidae, whose members are parasitic on Coleopterous larvae. The large family, Scelionidae, egg-parasites of various orders, was, strange to say, poorly represented, but three species of the genus *Scelio*, Latreille, parasitic on grasshoppers' eggs, were collected; these insects usually are taken running over bare ground, where the host grasshoppers occur.

Outside Queensland, very little collecting has been done; indeed, not more than six species in the whole superfamily have been recorded from Victoria. Mr. Dodd anticipates finding many new species in his Belgrave collections. The Proctotrypoidea group is little known to the average collector. Although of large dimensions, it is rather dwarfed by the immense size of the other parasitic group, the Chalcidoidea.

Mr. Dodd, who is a son of Mr. F. P. Dodd, of Kuranda, Queensland, has done excellent work in his special field. He will be glad to receive Victorian specimens of parasitic Hymenoptera—species in the families mentioned above.

LYCAENIDAE AND ANTS.

The larvae of many of the butterflies of the family Lycænidæ, the "blues" and "coppers," are attended by ants, which run about over their bodies. The larvae, apparently, secrete a sweet substance, similar to that secreted by the Aphidæ and Coccidæ, and this is eaten by the ants. The late Mr. L. Thorn, in his "Notes on the Life Histories of Some Victorian Lycænid Butterflies" (*Vict. Nat.*, July, 1924), states that "if the ants were not in the breeding-box to attend the larvae, the secreted liquid would form into a mould or mildew, which kills a number of species of Lycaenid larvae every season."

The ants are undoubtedly a protection against the attacks of ichneumon flies, but are, apparently, not indispensable to the well-being of the larvae. On April 20th, 1926, I found a larva of the "Moonlight Blue" butterfly, *Miletus delicia delos*, under the bark of a black wattle, *Acacia decurrens*, at Spring Vale. The larva was about one-third full size, and as is invariably the case with this species, was attended by small black ants (*Crematogaster, sp.*); but one only of these ants remained with the caterpillar when it was placed in a box to be taken home. This ant died within a few days, and for six months, the larva lived without the services of ants.

Two pieces of wattle-bark were attached by a rubber band to a small bottle containing the food plant (black wattle), and the bottle was placed under a small glass dome. One of the pieces of bark was fastened to the side of the bottle by a web spun by the larva, forming a sort of nest in which the larva remained all day, coming out at night to feed. During May, June and July, it fed sparingly and in August ceased to eat for some time. It remained in its retreat and appeared to be sick. I thought it was going to die, but one day I found that it had cast its skin and seemed to be quite healthy. It then fed freely, and it increased considerably in size during September and October. The larva pupated between October 20th and 24th, and the butterfly, a female in perfect condition, emerged on November 26th.—W. H. ROGERS.

The Mornington Naturalists' Club's local collection of orchids has been considerably increased, the following species having been added:—*Pterostylis acuminata*, *Prosophyllum odoratum*, *Thelymitra carnea*, *T. flexuosa*, *T. ixioides*, *Microtis porrifolia*, *Caladenia coerulea*, *C. clavigera*, *C. cordiformis*, *C. Menziesii*, *C. dilatata* (rare yellow and green form), *Diuris punctata*, and *D. sulphurea*.

The Victorian Naturalist

Vol. XLIII—No. 10. FEBRUARY 7, 1927. No. 518.

THE FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held on Monday evening, January 17th, 1927. The President, Mr. E. E. Pescott, F.L.S., occupied the chair, and about 140 members and friends were present.

The President welcomed Rev. H. M. R. Rupp, of Paterson, New South Wales, Mr. F. C. Tooke, of South Africa, and Mr. S. R. Mitchell.

CORRESPONDENCE.

From Chief Inspector of Fisheries and Game, stating that he had no intention of removing the Kookaburra from the list of birds protected under the Game Act.

From Mr. T. G. Sloane (Young, N.S.W.), advising donation of a copy of Dr. Tillyard's "Insects of Australia and New Zealand," to the Club's library.

REPORTS.

Reports of excursions were given as follow:—Mitchell Gorge, Mr. C. Daley, B.A., F.L.S.; Botanic Gardens, Mr. J. Searle.

ELECTION OF MEMBERS.

The following were elected as ordinary members.—Mr. J. Halliwell, 23 Grace-street, Moonee Ponds; Mr. L. Byrne, "Inglesby," Albert Crescent, Surrey Hills; and Mr. C. Deane, 9 State-street, Malvern. As Country members:—Mr. Robt. A. Kent, Narre Warren; and Mr. Alex. D. Selby, c/o Mr. W. Chequer, Quantong.

LECTURETTES, &C.

The President introduced the subject of the evening: "The Stone Age Man," and stated that there was ample scope in Australia for the collection of aboriginal stone weapons and implements. He also referred to the valuable work done in this direction by such enthusiasts as Dr. G. Horne, Mr. A. S. Kenyon, Mr. W. Gill, and others.

Mr. A. S. Kenyon gave an illustrated address, entitled, "An Afternoon in an Aboriginal Camping-Ground," in the course of which he described, and explained the uses of, many forms of stone and bone implements, such as scrapers, knives, and axes. Several types of aborigines were depicted on the screen, and their characteristics referred to by the speaker. Mr. Kenyon urged the collection of aboriginal relics for the benefit of posterity.

Mr. E. S. Anthony gave a short description of several stone axes and other weapons which he had on exhibition.

The President and Mr. Chas. Barrett each spoke briefly on the interest and importance of ethnology.

EXHIBITS.

By Mr. A. S. Blake: Australian Roller or Dollar-Bird, *Eurystomus pacificus*, from Molesworth; stone axe from Cathkin.

By Mr. A. A. Carter: Mould of the unique fossil gasteropod, *Cantharidus multicinctus*, Crespin, found in the Janjukian (Miocene) of the Flemington railway cutting. The original type specimen is from Keilor.

By Mr. F. Chapman, A.L.S.: Chellean implement, Sussex, England; eoliths from Ightham, Kent, England.

By Mr. C. Daley, B.A., F.L.S.: Water-worn pebbles; robin's nest of moss and lichen, from Mitchell River; stalactitic limestone; Supplejack on Mock Olive, *Notelaea longifolia;* Spear Grass-tree, *Xanthorrhoea hastilis;* Scaly Phebalium, *P. squamulosum;* Moutain Correa, *C. Lawrenciana*, all from Deadcock Creek.

By Mr. H. P. Dickins: Photographs and sketches, Mitchell Gorge, Xmas Excursion, 1926.

Mr. J. A. Kershaw, for National Museum: Aboriginal stone axes; flaked stone axe or pick, of quartzite, hafted; husking stone, used for breaking of hard seeds; hammers (for pounding, etc.); stone chisel or gouge, the shaped stone attached to each end of the handle by grass-tree resin, used for making the grooves seen on shields and other wooden implements; spear-heads of stone and glass, serrated, some showing method of fixing to haft of spear with resin; tools from kangaroo limb bones, used for making fine serrations on spear-heads—pieces of fencing wire also used for same purpose when available; knives of quartzite, hafted with resin, and sheath for same.

By Mr. W. Gill: Skull of aboriginal, found buried in sand, Kew Golf Links; stone implements.

By Mr. V. H. Miller: Rare Flannel-flower, *Lachnostachys Walcottii*, from Murchison district, W.A.

By Mr. A. S. Kenyon: Large series of aboriginal stone implements.

By Mr. E. S. Anthony: Stone implements, Australian and Tasmanian.

By Mr. W. H. Nicholls: Water colour drawings of orchids, including *Diuris punctata*, Smith, showing purple dots from which the plant received its name; *Diuris fastidiosa*, Rogers, a species recently described from specimens found by the exhibitor at Tottenham; *Calo-*

chilus imberbis, Rogers, a beardless *Calochilus*, also new to science, collected by Mrs. F. Rich, at Rushworth. *Calochilus cupreus*, Rogers, Copper-beards; *Cryptostylis longifolia*, R.Br., Large Tongue-orchid; *Caleana Sullivanii*, F.v.M., Spectral Duck-orchid—*Caladenia pumila*, Rogers, Dwarf Caladenia; and *Calochilus paludosus*, R.Br., Red-beards.

By Mr. W. H. A. Roger: Specimens of the Imperial Blue Butterfly, *Ialmenus evagoras*, bred from pupae collected on the Mitchell River, Xmas, 1926; specimens of the Wood White Butterfly, *Delias aganippe*, bred from larvae collected at Cheltenham, Dec., 1926.

By Mr. A. E. Rodda: She-oak scale, and galls formed by the same.

By Mr. C. Barrett: The Puralka Flint.

By Mr. J. Searle: Larval stage of *Xiphocaris compressa*, the so-called "Freshwater Shrimp"; mounted specimens of *Plumatella repens*, *Boeckella symmetrica*, *Simosa gibbosus*, *Chironomus* larva, *Ceratopogon* larva, shown under the microscope; also drawings of some of the commoner pond-animals.

By Mr. A. J. Williamson, per Mr. J. A. Kershaw: Skull of aboriginal from Nerrin Nerrin, near Streatham, Victoria, collected more than 50 years ago; the nasal cavity and eye sockets are rather larger than usual. Frontal bone of skull from Bermagin, New South Wales, showing very low forehead. Sacrum of aboriginal from Bermagin, N.S.W. Two rasps of vesicular basalt from Eddington and Bet Bet, Victoria; one showing an artificial groove, suggested as a grip for the fingers.

An interesting series of National Museum postcards, illustrating the Kangaroo, Black Swan, Platypus, and Lyre-bird groups, native camp, ceremonial decorations of Australian aborigines, the Main Hall, etc., has been issued. The cards, which are finely printed, and form excellent souvenirs of the Museum, are on sale, price 2d. each, at the Public Library, and the Book Lovers' Library, Collins-street, Melbourne. Doubtless many sets will be sent overseas, for the Museum cards are attractive as well as instructive. One subject, the Samoyede Sledge, should appeal especially to children.

The report in the press, of the death of a man after he had been bitten by a Frilled Dragon or "Jew" Lizard, *Amphibolurus barbatus*, brings to my memory that an aboriginal at Kewell, 54 years ago, warned us to be careful, for sometimes a "frilly jaw" caught a dog by the ear, and the dog died from the effects of the bite. These lizards, which I have observed feeding upon small black ants, change their colours. On a very hot day it is a common thing to see them, on fence posts, appearing quite yellow; while in cold and cloudy weather, they are dark-coloured. A specimen collected when yellow, after death, became nearly black.—JAMES HILL.

STONE IMPLEMENTS ON ABORIGINAL CAMPING-GROUNDS.

BY A. S. KENYON.

The term, camping-ground, includes "kitchen middens," "myrniong mounds," "ovens," "shell-mounds," "factory sites," "workshops," etc. The Australian aboriginal made no difference. Any suitable site was all of these, and a burial ground as well. A camping-ground was generally on sand, or at least on very sandy soil. If the soil was not sufficiently non-adhesive, a mound was built up, circular in plan, and rounded in shape, of the debris of cooking operations, burnt clay, burnt loam, bones, shells, and other debris.

Water in the immediate vicinity was essential, though its quality was not of importance, and, of course, access to food supplies, such as shellfish: on the coast, *Turbo undulatus* (the Green Whelk, or Warriner), *Haliotis* ("mutton-fish"), *Mytilus* (mussel), *Venus* (cockle), *Patella* (limpet), *Donax* (pipi), *Scutus* ("elephant-fish"); in fact, all kinds of edible molluscs, worms, fishes, and also, in favored places, the seal and the whale. Inland from the sea, the rivers yielded *Unio* (fresh-water mussels), *Astacopsis serratus* (crayfish), *Parachaeraps bicarinatus* (yabbie), *Oligorus macquariensis* (cod), *Copidoglanis tandanus* (cat-fish), *Ctenolates ambiguus* (perch), *Anguilla australis* (eel), and many other animals. Roots of all kinds, seeds of many plants, and a host of insects and their larvae, added to the larder.

The obtaining of the foods mentioned was the work of the gin or lubra, except the trapping and spearing of fish. Hunting, of a sort, was left to the male. The prey included kangaroos, wallabies, Emus and Plain-turkeys on the ground; pigeons, parrots, cockatoos, and other birds in the air; ducks, swans, pelicans, and herons on the water; 'possums (*Trichosurus*), Koalas (*Phascolarctus cinereus*), and flying phalangers (*Petauroides*) in the tree; and Wombats (*Phascolomys mitchelli*), Bilbeys (*Peragale*), and Rat-Kangaroo (*Potorous tridactylus*) in the earth. To these delicacies were added snakes, lizards (notably monitors, or goannas), and tortoises.

Camping-places may be roughly divided into three classes. First: those of an extremely temporary nature, where the remains are almost wholly food; implements and cooking-stones being rare; second, those where good shelter was obtainable, and varieties of food accessible;

where implements are generally sparse and of a crude nature; and third, those of a permanent nature, where aborigines were almost always to be found, and where the old men and women of the tribe stayed at home to carry on their arts and crafts. The first evidence of a camping-ground is the presence of foreign stones. These may be implements or tools, no matter how primitive, or they may be cooking-stones. Careful examination will show their nature. The second evidence is that of the presence of food remains. If there are large quantities of shells, the proportion of edible species is a guide, and in the case of univalves, the shell generally is broken in some place—done to facilitate removal of the animal.

Raised beaches, which are frequent around Port Phillip, have been mistaken for kitchen-middens. At Point Cook and at Altona, the middens merge gradually into old beaches. In Victoria, at almost every place where sand has drifted, leaving the under-surface exposed, will be found stone and food remains. If in a locality favourable for food and water, a full range of the stone implements of the locality will be obtained. Anything resembling an implement, if formed from local stone, must be viewed with the utmost suspicion, as fire, sun, frost, impacts from water or wind action, or from wandering animals, may cause fractures and give rise to quite respectable "eoliths." Similarly, foreign stones need very careful examination for some indication of the reason for their appearance on the camp-site.

Sometimes are discovered little caches of unused quartz pebbles, to be used after as hammers; of portions of diabase or greenstone to be formed into axes; and of flat pieces of sandstone to be employed for grinding. Foreign stones may, then, in general be accepted as artefacts either in esse or in posse. Exceptions are gizzard-stones. These, which have roughly deltoid faces, are sometimes two inches in length, and in such case, have been obtained from an Emu, slain by the black hunter.

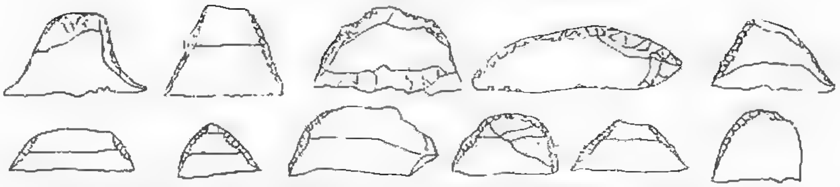
The prevailing stone remains, after the fire-stones have been examined and accounted for, are fragments of quartzite, flint, tachylite, and similar hard and brittle rocks. At first, these are picked up indiscriminately, but shortly closer examination reveals that they fall into distinct groups: (a) small but definite shapes, mostly retouched or secondarily chipped in regular fashion; (b) larger shapes, much less definite, with secondary working of a much coarser nature; (c) similar flakes, but without retouching; (d) large pieces with coarse chipping; and (e) cores or nuclei, from which flakes have been struck. By far the greater number show no sign of working. These cannot, however, be classed as "wasters," as is customary, no implement being discoverable the making of which would result in such remains.

The greater part of a blackfellow's needs in the way of cutting, whether flesh, skin or wood, was met by the sharp edges naturally resulting in the striking off of flakes. From the nature of things, these flakes generally assumed a leaf-like shape, with one or more distinct median ridges, a more or less triangular cross-section, and a well-marked bulb of percussion at the butt The finer-grained the stone and the more conchoidal the fracture, the more perfect the leaf-shape, the ridge and the bulb. With the coarser-grained, less silicified rocks, the more imperfect the flakes until the features mentioned become hardly recognisable. It is to be feared, however, that our black brother was not troubled about these departures from type. He was a poor, primitive creature, who allowed the material available to govern him, and did not attempt the impossible.

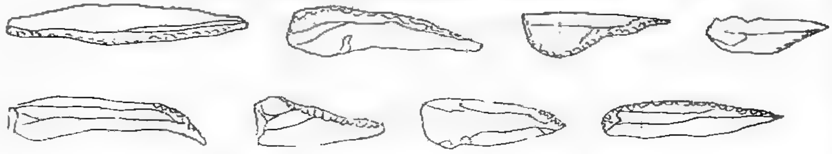
Just as his successor, the white man, when he breaks a piece of window-glass or a bottle with which to shave down his golf club shaft to make it more whippy, or to smoothen a handle for some tool, uses it for a few strokes only until the edge dulls, and then throws it down, so acted the black man. The so-called waster was a tool, and the principal one of the aboriginal journeyman. But there were specialists, generally old men, not supple enough for the hunt. From the type flake of elongated triangular shape, several quite distinct implements, though probably for one general purpose, were evolved. The most important and widespread is that one sometimes designated the "chatel perron," or "chipped back" knife, though "crescent" is a safer term. It may be stated at once that, whatever else it may be, it is not a knife; that is, the edge formed by the intersection of the two side planes, is not used for cutting or for any other purpose.

Those acquainted with the Australian aboriginal well know that if there be an edge sharp enough to use for cutting, he will not waste time and energy chipping at other parts of the implement, especially as such an edge being necessarily of an acute character will not retain its keenness for more than a few strokes. The misconcep-

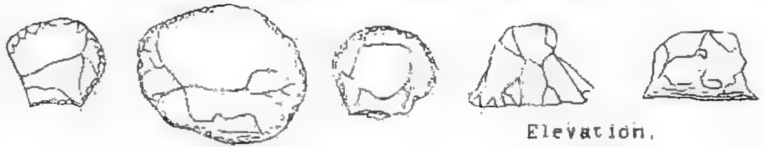
Plate XVI.



CRESCENTS
No chipping on edge unless shown in sketch. Natural Size.
Reverse plain in all cases.



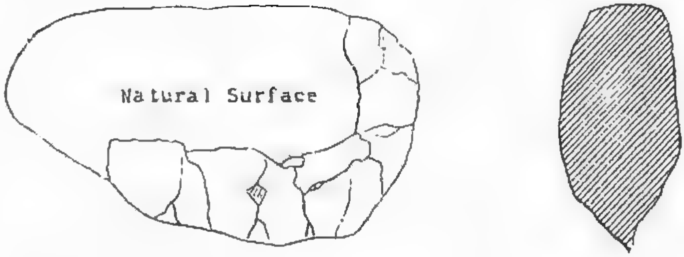
POINTS.
No chipping on edge unless shown in sketch. Natural Size.
Reverse plain in all cases.



GOUGES.

Elevation.
PLANES.

No chipping on edges unless shown in sketch. Natural Size
Reverse plain in all cases.



PEBBLE CHOPPER. Natural Size.

Aboriginal Stone Implements.

tion probably, is due to the fact that all the implements so termed and described by various European investigators, were formed from a high quality stone, which invariably yielded a fine-looking cutting edge. Although some of the stone available to our native was of similar quality, much was of a coarser texture.

An inspection of the specimens, as gathered, will reveal quite a number without a cutting edge worthy of such a description, while as many are minus the chipped back. The invariable characteristic is chipping, or retouching of the sides or wings of the implement, these being, in some instances, so prolonged as to give a distinct "cocked-hat" appearance. Chipping, often of such fineness as to call for the use of a hand-glass to discern, is invariable at the points and sides, and generally extends right around the back. This is frequently carried to such an extent that the implement becomes bow-shaped, and is often extremely elongated. One of these elongated types broken in the centre, will give two implements of the class known as "points." These are found, as separate implements, in great numbers; but from their merging into the previous class, their use is probably similar. This use cannot be definitely stated, as no person in close contact with the blackfellow while still using them, has left any record of their purpose.

Chipping on one edge only necessarily results in a working edge, which is in one line, or as nearly so, as the under-surface is nearly a plane. Hence, for scraping, planing, carving and grooving tools, chipping on one side only is the one feasible way of turning out the desired implement. Nothing is more erroneous than the idea that such a method of manufacture is an evidence of lower civilisation. Implements chipped from both sides are either chopping implements, or are weapons which call for penetration. The wavy, undulating edge thus produced is not suited for pressure work, such as is called for in the fashioning of wooden implements, or the dressing of skins.

As universal as the "crescent," is the gouge or adze, another graving tool. It is circular, or nearly so, in shape, and is chipped in much the same way. Like the "crescent" and its varieties, it was hafted, or rather fixed with gum, in the end of a stick, so that considerable pressure could be exerted upon it. It was probably used for grooving, the favourite method of ornamenting clubs, boomerangs, and other weapons. It has a great range in size, varying from one quarter of an inch to three inches in diameter. Finally, of the smaller chipped implements, come the "planes," although some of them are of large size. These have in other parts been called cores: but they are implements, and are in parts very numerous.

A large and nondescript class is that including "scrapers." These are not unlike the gouges and other smaller implements, but have no defined form or systematic chipping on their edges. Some have projecting points, definitely purposeful, and probably groovers: others have re-entrant notches, and were probably spear scrapers or pointers. In some places, these more or less worked stones are as numerous as the untouched flakes. Like all these retouched implements, they are Australia-wide, and also world-wide. The output of primitive man in other parts of the world, was apparently much the same as that of the Australian, for their stone implements are in every way identical.

Still keeping to the cutting group of stone implements, we find numerous chipped pebbles. These, which may be called choppers, as they hardly merit the term axe, are easily the most important of Australian aboriginal stone implements, and greatly outnumber the ground-edged axes. Where pebbles of sufficiently good stone for this purpose, though probably not good enough for the axe, are numerous, hundreds may be picked up at a camping-place, where not more than one or two ground-edged axes, possibly none, will be found. Their use is not better known than that of the smaller chipped implements. Sometimes made from stone tough enough for a better implement, they display a series leading right up to the neolithic or ground-edged axe.

The under or unchipped surface of the pebble-chopper, in most cases, has a natural bevel, similar to that of the ground implement. On the chipped side, the surface is, of course, irregular, with certain protuberances. Occasionally, instead of chipping or knocking these off, the native workmen rubbed or ground them down. The advantage of this method is manifest: the practice extended until nearly the whole of the chipped side was ground. The other, or natural, pebble side was then found to be improved by a little grinding, with the result that the ground-edged axe emerged. The term ground-edged is used, for the term "polished" is frequently inapplicable, and is merely a bad translation of the French word "poli." Grinding, in almost all Australian axes, is confined to the cutting edge.

Undoubtedly, the first use of stone by man was for pounding or hammering, the breaking of a nut, the crushing of a seed, or the bruising of a root. The broken pieces resulting gave him his first cutting tool. These were used as knives, or saws, the result desired being obtained by a serrated edge drawn along under pressure. For such work the desirable stone was one brittle, but very hard. The cutting edge was always obtained by breaking, the brittle quality precluding any advantage being obtained by grinding. The chopping implement, the later development, called for an exceedingly tough stone to stand the impact, and a tough stone could not be very hard. This was the big step in human advancement from the saw-knife to the chopper, neither of which was ground.

From the completeness of this series, most important inferences can be drawn. If the complete chain of development is there—if is found what may be termed an embryo-genetic series of implements—the conclusion is that the culture developed locally. If there occurs a marked gap between the low class forms of scrapers and cutters, found universally, and the highly developed, ground and fashioned implements, then it is a fair assumption that the culture is migrant, and has been carried to the place. On this hypothesis, all, or practically all, the European cultures are migrant, and their sequence in geological horizons is no proof of their sequence in cultural development. The Australian and Tasmanian implements have been locally developed. Australia must consequently have been peopled, in the beginning, by a most primitive, stone-using people.

Among the various stones scattered round are numerous quartz pebbles. These are generally hammers or pounders. Sometimes the more perfectly shaped ones were used for games, like dumps, marbles, etc. No attempt was made to shape the hammers, as their existence was short and their usefulness not improved thereby. Occasionally a hammer was made from greenstone or diabase (the axe stone), and its toughness and consequent longevity lead to finger-grips being made for better handling. Anvil-stones, showing signs of blows, are frequent. These often were used until the hollow resulting from continued blows became so deep that the stone broke in two.

Grinding-stones, both upper and lower, pieces of raddle, or red ironstones, cores, or nuclei from which flakes have been struck, complete the series of primitive stone implements to be found on the camping-grounds.

The Orchids of Victoria

BY EDWARD E. PESCOTT, F.L.S., F.R.H.S.

PART VI.

15. CALADENIA, R.Br.

(Beautiful Glands).

Dorsal sepal erect, incurved over the column, or more rarely retracted, usually narrow, lateral. Sepals nearly equal to it, but flat, spreading or reflexed. Labellum often on a movable claw, erect at the base, undivided or 3-lobed; the lateral lobes erect, when present; the middle lobe or upper part of the undivided labellum recurved: the margins often fringed or toothed: the lamina with sessile or stalked calli, arranged in two or more longitudinal rows or irregularly scattered or crowded. Column erect or incurved, more or less two-winged in the upper part. Another terminal, two-celled, more or less oblique, usually pointed, valvate. Pollinia 4, granular. Stigma below the anther, circular and disk-like.

Terrestrial herbs, generally very hairy, sometimes only slightly so, originating from underground tubers, the more recent tubers generally found below those of last season; tubers often sheathed in successive layers of fibrous wrappings. Leaf more or less hairy, solitary, elongate, generally linear-lanceolate or oblong, from within a sheathing scale close to the ground. Flowers solitary, rarely 2 or 3, or in a raceme of upwards of 6, on an erect scape with an empty bract: flowers usually erect, and variously coloured.

Usually known as "Spider-orchids," especially those species carrying long-tailed sepals, this attractive genus is known all over the Commonwealth. One species, *C. Menziesii*, is glabrous, all of the others are hairy, some very much so. The reproduction of this genus presents some very interesting features, see (7).

There are upwards of 60 species, 54 of which are recorded from Australia, so that this is almost exclusively an Australian genus. Three or four species are known from New Zealand. *Caladenia* finds its highest expression in West Australia, where 35 species are recorded. Victoria occupies second place, with upwards of 20 species. Queensland has only 5; New South Wales 16; Tasmania 12; and South Australia 18. The Australian species are all endemic, with the exception of *C. carnea*, which is recorded from Java.

SECTION 1.

Flowers usually in shades of yellow, green, red-brown, or white. Lateral sepals elongate, constricted into acuminate or caudate points; petals not longer than sepals: *two sessile yellow glands at base of column.*

C. cardiochila, C. cordiformis, C. leptochila, C. reticulata, C. clavigera, C. Patersonii, C. pumila, C. dilatata.

SECTION 2.

Flowers crimson or cream-coloured. Lateral sepals elongate, contracted into caudate (tailed) points; petals not longer than the lateral sepals; *no sessile yellow calli at base of column.*

C. filamentosa, and var. *tentaculata.*

SECTION 3.

Flowers pink and white; petals erect, longer than the lateral sepals; *no sessile yellow calli at base of column. Leaf glabrous.* Petals red, clavate, lateral sepals white.

C. Menziesii.

SECTION 4.

Flowers pink, white, or blue: perianth segments all similar in shape and color: upper one usually erect, others spreading, relatively much wider and shorter than on Sections 1 and 2, never produced into long points. *No sessile yellow calli at base of column.*

C. latifolia, C. carnea, C. praecox, C. alba, C. congesta, C. angustata, C. testacea, C. iridescens, C. cucullata, C. coerulea, C. deformis.

SECTION 1.

1. C. CARDIOCHILA, Tate. (heart-shaped labellum). "Fleshy-lip Caladenia."

Slender, hairy, 6 inches to 10 inches in height. Leaf slender, lanceolate, hairy: Flower single, rarely 2, pedicel slender. Perianth segments brownish red, with yellow margins. Dorsal sepal linear-lanceolate, erect incurved: lateral sepals much wider, spreading, flat. Petals much narrower, linear-lanceolate, spreading or depressed. Labellum on a narrow movable claw; *cordate or broadly ovate;* undivided, margins entire with a conspicuous dark-brown thickening round the apex: rather flat, erect at base; colour reddish-brown or yellow with dark divergent veins: *lamina with 2 (rarely 4) rows of dark clavate fleshy crowded calli.*

This orchid is figured in colours in the *Proc. Roy. Soc. Vic.*, Vol. XXIII. (1916), under the name of *C. Cairnsiana*. The labellum is very fleshy, and quite heart-shaped. It is a rare species, occurring at Grantville, in Gippsland, also in E. Gippsland, and near Murrayville, in the Mallee. It also occurs in South Australia. Flowering season, Sept.-Oct.

2. C. CORDIFORMIS. Rogers. (heart-like labellum). "Small Spider-orchid."

A very hairy robust plant, upwards of a foot in height. Stem and leaf hairy, with a single bract on the stem. Flowers 1, rarely 2, with stem bract. Lateral sepals *greenish, with a broad red-brown stripe* down the centre; spreading; dorsal sepal usually erect and incurved over the anther; greenish yellow, having three brownish veins. Lateral sepals spreading, greenish yellow, with reddish brown central stripe; lanceolate. Labellum movable on short claw; half length of petals and sepals, *widely cordate;* incurved at tip, margins entire; indefinitely three-lobed; lateral lobes wide; middle lobe dark red, broadly triangular, recurved, apex rather blunt, margins slightly crenulate. *Calli in 4 rows (rarely 2)*, fleshy and dark red in colour.

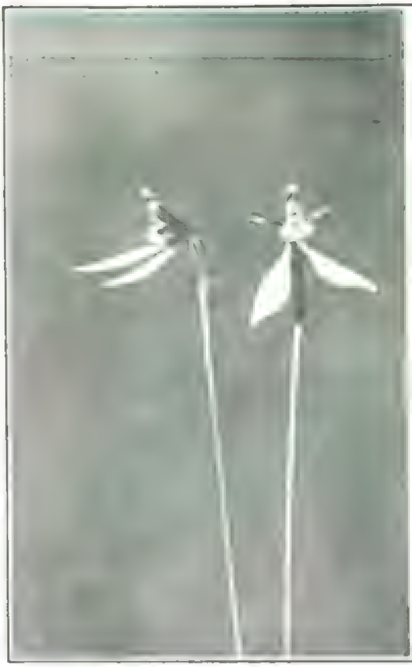
This species was erroneously known for many years as *C. Cairnsiana*. It is widespread in the S.E. and N.E., the dark brown colour scheme generally distinguishing it. It flowers in Sept.-Oct., and is not recorded from any other State.

3. C. LEPTOCHILA. Fitz. (thin labellum). "Narrow-lip Caladenia."

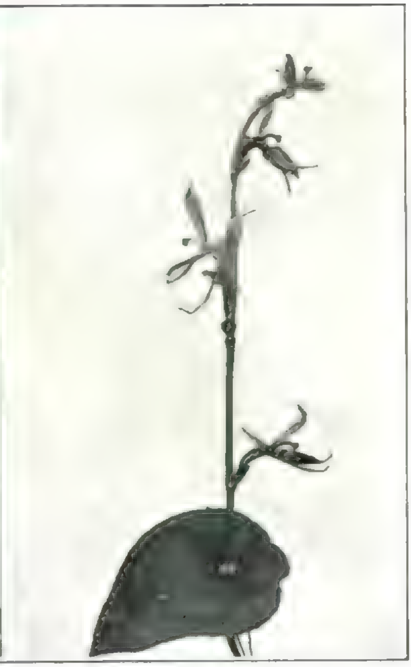
Slender, hairy, and in this State very short, not more than 6 inches in height. Leaf narrow lanceolate to oblong, very hairy. Flowers 1-2, medium size in this State, yellow, green and red-brown. Perianth segments red-brown down the centre. Sepals clavate (clubbed). Dorsal sepal incurved, tapering to a fine clavate point, lateral sepals dilated at base, afterwards constricted to fine clavate points. Labellum *oblong or broadly lanceolate,* on a movable claw undivided, red brown, erect in lower half and then recurved; margin entire; tip acute, but sometimes blunt; calli sessile, in 4 rows, rarely extending beyond the bend.

This is also a very rare species in this State. It is known from the Horsham district, and also from the S.W. It is dwarf in character, with quite a conspicuous

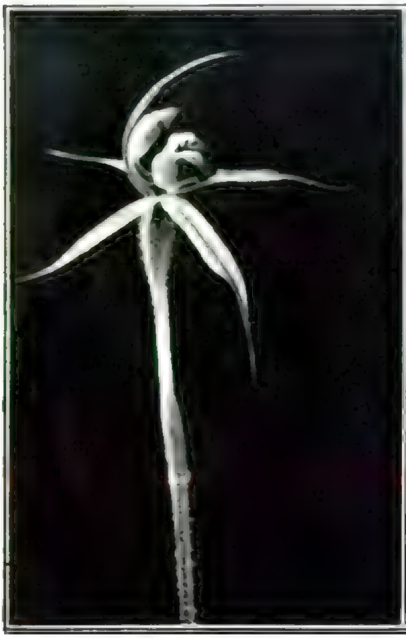
Plate XVII.



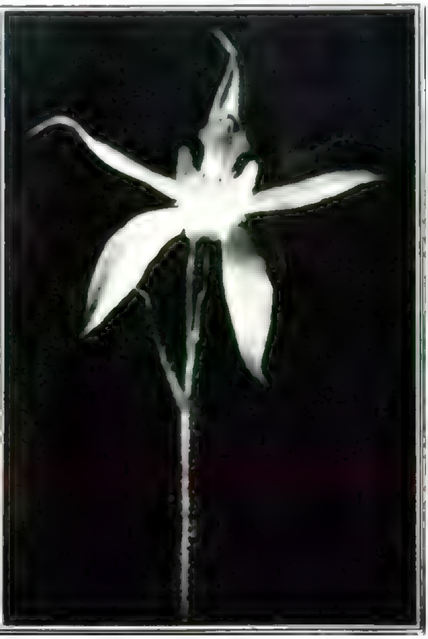
Eriochilus autumnalis, R.Br.
"Parson's Bands."



Acianthus exsertus, R.Br.
"Mosquito-orchid."



Caladenia cordiformis, Rogers.
"Small Spider-orchid."



C. pumila, Rogers.
"Dwarf Caladenia."

labellum. It is recorded also from South Australia. Flowers in October.

4. C. RETICULATA. Fitz. (netted, referring to the labellum). "Veined Caladenia."

Slender, upwards of a foot in height. Leaf very hairy, linear, channelled. Flowers large, 1-2, yellowish green and crimson. Sepals yellowish green, equal, with red central markings. Dorsal sepal erect, incurved, point filamentous and clavate; lateral ones spreading, thin, clavate. Petals lanceolate, darker, shorter, with crimson red centres. Labellum on movable claw, crimson or crimson and yellow, *ovate;* lower half erect with dentate margins; recurved part acute; calli in 4 rows, fleshy, crimson, clubbed; lamina smooth at tip, usually *with dark crimson veins,* which are occasionally inconspicuous.

This species, at first glance, is often taken for a colour variety of *C. Patersonii,* but the shape and veinings of the labellum differentiate it. It flowers usually in October, but in hill country is often found as late as New Year. The yellowish colorations are very distinct. It is recorded from the S.W., and S., and also from South Australia.

5. C. CLAVIGERA. A. Cunn. (clubbed). "Clubbed Spider-orchid."

Plant hairy, up to 9-10 inches high. Leaf solitary, linear-lanceolate. Stem hairy, with a narrow bract above the middle. Flower usually solitary, pale red and yellow; sepals similar to petals, but slightly longer, dorsal sepal usually recurved over the column; sepals terminating in distinctly clavate glandular points. Labellum with 4 rows of calli on the lower half; ovate, recurved, margins entire.

This plant is very commonly confused with *C. Patersonii.* The clubbed sepals, and the entire margins of labellum, distinguish it from that species. The confusion is very marked in the dried state of the plants, for the clubs, being brittle, very often break off quite freely. It is recorded only from the S., N.E., and E., but is possibly more widespread in Victoria than present records indicate. Recorded also from N.S. Wales and Tasmania. Flowers from Oct. to Dec.

6. C. PATERSONII. R.Br. (after Col. W. Paterson, Lt.-Governor of N.S. Wales and Tasmania). "Common Spider-orchid."

A species variable in height, but usually tall, upwards of 15 inches. Whole plant very hairy; leaf oblong to linear-lanceolate. Flowers 1-3, white, pale yellow to dark red, usually large; perianth segments up to 6 inches long; spreading, often glandular, hairy at tips and on backs. Dorsal sepal often incurved over the column; sepals not clavate. Petals somewhat shorter, tapering to fine points. Labellum long, usually with crimson-purple tip and calli; ovate-lanceolate on short claw; basal half, erect, with acutely toothed margins, anterior portion recurved, usually purple or crimson, margins bluntly toothed or serrate with acute tip. Calli in 4 rows, clubbed, red coloured, hardly extending beyond the bend.

This is the common spider-orchid, known all over the Commonwealth. It frequently occurs in colonies, whose root-systems are unitedly connected underground. The flowers are larger and more conspicuous in West Australian specimens, the sepals frequently being 6 inches in length. It flowers from Sept. to Nov.

7. C. PUMILA. Rogers. (dwarfish). "Dwarf Caladenia."

Dwarf, 2 to 4 inches high, hairy. Leaf single, oblong-lanceolate, clasping at base. Stem short, stout. Flower solitary, white, relatively large. Sepals and petals wide, almost of equal length; dorsal sepal erect, often incurved. Labellum on short claw, white, with narrow pink margins; 3 lobed, ovate, blunt at apex; lower half erect, with entire margins; then recurved with distinctly serrate or crenulate margins; calli in 4-6 rows, pink, narrowly linear, ending near middle.

This large-flowered, white, dwarf species is recorded only from Bannockburn, where it was discovered by Miss B. Pilloud. It differs from *C. Patersonii* in its dwarf habit, and in the absence of filamentous points, and glandular hairs on the perianth segments. The blunt labellum, and its serrate, but not toothed edges, are conspicuous. The plant flowers in Sept.-Oct.

8. C. DILATATA. R.Br. (widened, referring to the labellum.) "Fringed Spider-orchid."

Usually robust, from 6 to 18 inches in height, hairy. Leaf solitary, hairy oblong to elliptical—sometimes linear-lanceolate. Flower solitary, rarely 2, sometimes 4 inches to 5 inches in diameter. Perianth segments all spreading except dorsal sepal, which is erect, dilated at base, thereafter, narrow, extending to a filiform point. Sepals usually, but not always, clavate, petals not clavate. Colour usually yellowish-green with red centre. Labellum purplish maroon, green and yellowish white, on a very sensitive, movable claw, 3 lobed, recurved near middle; lateral lobes erect green, anterior margins very deeply serrated or fringed; middle lobe recurved, widely lanceolate, margins serrate, tip maroon; calli in 4 rows, usually prominent, those near claw thick, long, prominent and fleshy. Column much incurved, widely winged.

This well-known, abundant spider-orchid is found in every part of the State, occurring in all types of soil, from sea-coast sand, to clay silurian soils inland. It is usually at its best in dry ironstone country, where very large specimens are collected. One plant sent to me from Tooborac, had on the stem two large flowers, the sepals of which were over 2½ inches in length. It is often found in considerable colonies, and, like *C. Patersonii*, the root systems often connect underground. The wide, *combed labellum* greenish and maroon are its distinguishing features. Occasionally albino forms are found, which may be white, cream-coloured, or greenish white. Sometimes these albinos show no colour, and sometimes the tip of the labellum is maroon crimson in colour. A distinct hybrid between this species and *C. Patersonii*, was recorded by J. Pescott from the Dandenong Ranges.

This species is recorded also from New South Wales, Tasmania, South and Western Australia. It flowers from September to November.

SECTION 2.

9. C. FILAMENTOSA. R.Br. (thread like, referring to the perianth segments.) "Tailed Caladenia."

Very slender, slightly hairy, 6 inches to 15 inches in height. Leaf solitary, very narrow linear, slightly hairy. Flowers 1 to 3, uniformly crimson in colour; perianth segments all broad at base, narrowing for three-fourths of their lengths to long and hairy filaments, often two or more inches long. Lateral sepals and petals spreading, dorsal sepal at first erect and then incurved over the column. Labellum more ovate than cordate, on a short claw; erect against the column, with shortly serrate margins; the frontal half recurved, tip entire and not acute; lamina with two closely set rows of calli, extending to the bend, sometimes light coloured with distinctly crimson veins. Column with wide wings above, less widely winged below.

A not common species, conspicuous for its long slight crimson perianth segments, which are hairy or glandular hairy. The species' name is very apt, for the segments are quite filamentous. *The 2 rows of calli* are its chief distinguishing feature.

Bentham, in *Flora Australiensis* records this as, "Stature and inflorescence of the typical *C. Patersonii*, and very nearly allied to it." But he records the two rows of calli. There is a crimson coloured form of *C. Patersonii* which might be confused with this species, for the perianth segments are often quite narrow. But it can easily be distinguished from the more robust species by its two rows of calli, and the absence of the two yellow calli at the base of the column. It is recorded from S., S.W., and E., and flowers in September. It also occurs in New South Wales, Tasmania, South and Western Australia.

Var. TENTACULATA. Tate. (tentacled, referring to long narrow feeler like perianth segments.)

Tate published this as a species, but there appears to be no difference between this and *C. filamentosa*, except in the colour. The variety is cream coloured, with a reddish maroon or reddish brown central stripe, becoming coloured at the tips. The labellum is cream-coloured, with very distinct divergent veins of the same colour as the central stripe.

This variety is rare in this State, being recorded chiefly from the N.W.

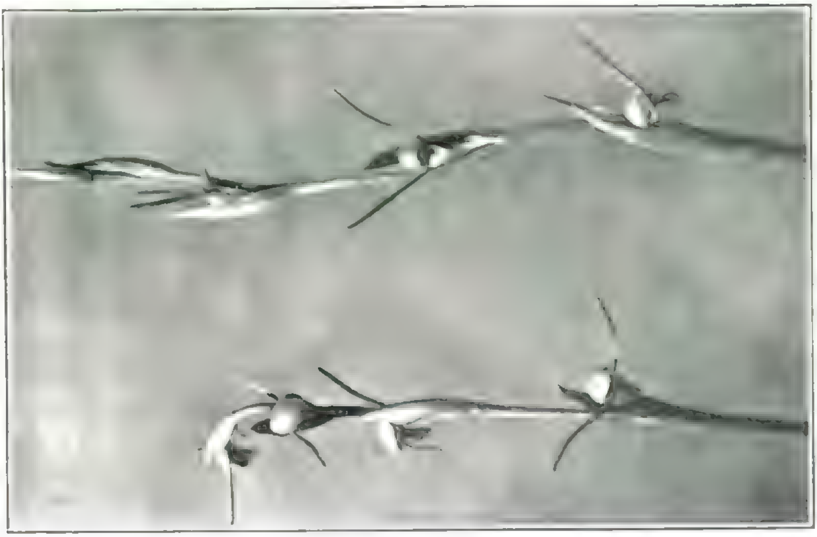
SECTION 3.

10. C. MENZIESII. R.Br. (after A. Menzies, a Surgeon-botanist). "Hare-orchid."

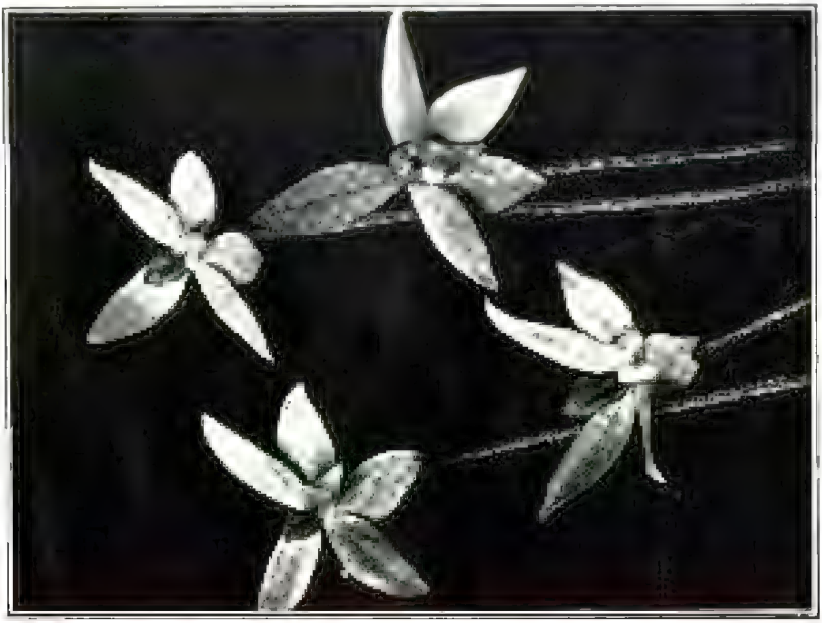
Generally slender, from 3 to 9 inches high. *Leaf bright green, glabrous*, ovate-lanceolate or broadly oblong-lanceolate. Flowers 1, rarely 2 or 3, white and pink, rarely albino. Dorsal sepal reddish, glandular hairy on back, spatulate-lanceolate, abruptly incurved over the anther, concave. Lateral sepals spreading, white, *crescentic*, wide in middle, contracted towards both ends, as long as dorsal sepal. *Petals carmine-red, often crimson-lake*, narrow linear in lower half, *clavate* and glandular in upper half, *stiffly erect*. Labellum on short claw, white with conspicuous transverse pink markings, orbicular-ovate, undivided, erect at base, tip white, blunt, recurved; margins entire; calli in 2 to 4 rows, shortly clavate, on slender pedicels, not extending to tip. Column erect, with transverse pink markings; widely or broadly winged.

The "Hare"-orchid is so named because of the two carmine petals which stand up erect like the ears of a hare.

Plate XVIII.



ORTHOCERAS STRICTUM, R.Br.,
Horned Orchid.



GLOSSODIA MAJOR, R.Br.,
Wax-lip Orchid.

The bright green glabrous green leaves are often found in forest country in very considerable colonies. Some years the colonies will not produce a flower, and in others flowers are abundant. It is generally a cool climate orchid. At Cheltenham I once collected several plants of this orchid having variegated foliage.

It is recorded from S., S.W., and E., and flowers in Sept.-Oct. It also occurs in Tasmania, South and West Australia.

SECTION 4.

11. C. LATIFOLIA. R.Br. (wide-leaved). "Pink Fairies."

Moderately robust, hairy, from 4 to 12 inches high. Leaf very hairy, oblong lanceolate, often 3 inches long. Flower 1, occasionally 2-3, pink, rarely white, fairly large. Perianth segments, lighter coloured on outside, glandular-hairy, spreading. Dorsal sepal erect, and not acute; lateral sepals free, or slightly adhering at base. Petals shorter, lanceolate, contracted at base. Labellum same colour as flower, sessile; deeply three lobed, lateral lobes and base erect, clasping the column, margins entire; middle lobe recurved, broadly lanceolate, fringed near base with a few marginal calli, or blunt teeth; calli of the disk or lamina linear-clavate, in two rows converging, or forming a semi-circle at or near the bend. Column erect, hairy on back, moderately winged throughout.

The "Pink Fairies" are frequently common at the seaside, often growing in pure sand, dashed by the sea-spray. Usually a seaside plant, it also occurs far inland. The bright pink flowers, with the very beautiful labellum, are conspicuous in September and October. The broad, large, green, hairy leaf is quite readily seen, growing flat on the ground.

Recorded from the N.W., S.W., S. and E., of Victoria, and also from all of the other States.

12. C. CARNEA. R.Br. (flesh coloured). "Pink Fingers."

Usually dwarf, slender, variable in height, from 2 inches to 10 inches. Leaf often very narrow linear, sometimes longer than the stem. Flowers 1 to 3, rarely 5, pink, sometimes white. Perianth segments dull green coloured on the outside, with glandular hairs, and sometimes pink striped; glabrous and pink inside. Tips often acute, usually blunt. Dorsal sepal erect or slightly incurved, linear; lateral sepals free, spreading, lanceolate. Petals narrower than sepals, about same length. In some forms, especially in early flowers, all segments are equal. Labellum sessile, three divided, erect at base, recurved beyond the middle; lateral lobes broad, erect, margins entire; middle lobes lanceolate, dentate or fringed with calli; lamina with two rows of stalked, clubbed calli, often four rows at base not extending beyond the bend, *with transverse red linear* bands. Column incurved, narrowly winged, *with transverse linear red markings.*

This dainty spring orchid is very variable, sometimes the plants are quite tiny, others are tall and slender. The four petals and sepals are often spread out like the fingers of the hand, and thus the flowers are often known as "hands." The species is variable in colour as well. Frequent albino forms are seen, and occasionally the carmine markings on the labellum and column are absent. Very large forms, having quite wide sepals and petals, occasionally appear in New South Wales.

The species is widely distributed all over the State, flowering from July to October. It also occurs in all of the other States.

13. C. PRAECOX. Nicholls. (early).

The following description, abridged, is taken from the author's published record.

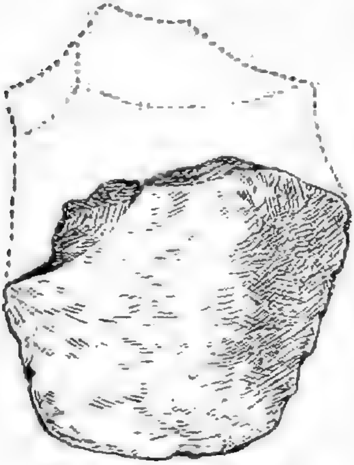
A graceful and rather slender species about 15 c.m. (approx. 6 inches) in height. Stem thickly covered with short hairs. Leaf very long, narrow-linear, sparsely hirsute. Flowers 1 to 3 on slender pedicels. Perianth segments falcate-lanceolate or elliptic-lanceolate, thickly covered with glandular hairs and glands. Lateral sepals and petals spreading narrow at the base. Dorsal sepal concave, incurved, forming a graceful hood. Labellum erect at base, recurving at tip. White with purple blotch at tip, hardly 3 lobed, markedly denticulate or fringed, except at the forward one-third. Lobes obtuse. At the tip, margins somewhat crisped or irregularly and shortly denticulated. Calli short, stout and clavate, in four somewhat irregular rows. Columns slender, irregularly spotted or blotched with red.

This newly-published species, which flowers in July, has long been regarded as an early form of *C. carnea.* Indeed, the differences are so slight, that, apart from variations of colour, and the fact that this form flowers early, the species might possibly be considered a variety of *carnea.* It is recorded only from the South, from districts near Melbourne.

THE PURALKA FLINT.

By Charles Barrett.

Found in association with remains of extinct Marsupials (including *Macropus anak* and *Sthenurus atlas*, *Perameles* sp., and *Phascolomys* sp.), the artefact known as the Puralka Flint is probably a relic of pre-historic man. It is undoubtedly a worked flint flake, with the bulb of percussion well defined and secondary chipping. And the fact that it was disenterred, with a large number of Post-Tertiary fossils, about 6 feet from the surface, is strong presumptive evidence of its antiquity: it could not, as some one has suggested, have fallen through a fissure into the shallow limestone cave at Forrestfield, Puralka, Victoria, where it was discovered by Mr. J. S. Lockie.



The Puralka Flint.

I visited the spot, in company with Mr. Lockie, and dug out more fossils, all referable to extinct animals, notably giant kangaroos. The discoverer of the Puralka Flint considers that it is an ancient artefact, and not of comparatively recent origin. There is no reason why Australia should not have been the homeland of a vanished race—a prehistoric people. Indeed, evidence in support of the belief that the aborigines we know were preceded by men still more primitive, is accumulating. The Cohuna Skull is the most important relic yet discovered; other remains perhaps as ancient, have been found, and other artefacts, doubtless contemporary with the Puralka Flint, are, I believe, preserved in private collections. There is need now for a survey of all the facts and theories, for a comparative study. Almost certainly further discoveries of importance will be made; discoveries that will either modify our views, or confirm them: the latter, I am hopeful, will be the case.

Ancient middens undoubtedly exist; though ethnologists may not agree as to their relative antiquity. Prehistory is a study in which imagination, controlled by scientific method, must mould conclusions. So an amateur even may attempt to picture the past: he is not less likely to be wrong than the scientific pre-historians, since they differ widely from each other in their views.

The Puralka Flint is a large fragment of a neatly fashioned implement, which resembles an eolith, an artefact of the Palæolithic Industry. It has been examined by several students and collectors of Australian "Stone Age" implements, all of whom agree that it *is* an artefact, while not admitting its antiquity. It can be matched by modern worked flints That is the reason advanced for refusal to accept the Puralka Flint as a relic of prehistoric man. This may be so; but how did it come to mingle with fossils, many of them embedded deep in Post-Tertiary limestone? There's the rub for doubters.

Keen search for artefacts, ancient or recent, should be made, in North-western and South-western Victoria especially. We may really be on the trail of ancient man in Australia. The Club's "Stone Age Evening" has stimulated interest in all that pertains to the aborigines. Let that interest be fostered. A visitor told me, after the meeting, that he knew of a cave in the Mount Gambier district, S.A., containing skeletons of aborigines—modern folks. And I have news of finds in other caves near, or across, the Victorian border. A rich harvest, perhaps, awaits earnest gleaners.

ORCHID SECTION MEETING.

Ten members attended the meeting of the Orchid Section of the Club, held in the National Herbarium on February 2, 1927. Mr. E. E. Pescott occupied the chair. After examination and discussion, it was decided to forward the proposed new species of *Pterostylis*, together with plate and description by Mr. W. H. Nicholls, to Dr. Rogers for confirmation. An article, entitled "The Vernaculars of Our Orchids"—a few suggestions by Messrs. A. B. Braine and W. H. Nicholls, was read and favourably commented on. The matter was referred to the Plant Names Committee. Questions of nomenclature were discussed, and recommendations made.

The Oriole (*Oriolus sagittatus*), like the Wattle-bird, evidently finds it expedient to change its habits to suit its environment. Orioles are numerous here at Tyers during the summer and autumn, but they rarely remain with us through the spring. It is, indeed, a common saying among us, "When the first fig colours the Orioles come." For a number of years the Orioles have appeared within one or two days of the first "colouring" of figs. Although we have never seen an Oriole feasting on vine-moth caterpillars, we have often found them very willing to enjoy the grapes. They are very fond of cockchafer beetles, which they catch during the summer evenings. Each insect captured is beaten against a branch or post, and the wing-cases (elytra) having been removed, is devoured.—J.G.

THE MITCHELL GORGE EXCURSION.

BY C. DALEY, B.A., F.L.S.

(*Read before the Field Naturalists' Club of Victoria, January 17, 1927.*)

This year it was decided to break fresh ground by having the Christmas excursion at Deadcock Creek, contiguous to the Mitchell Gorge, about 160 miles from Melbourne. Accordingly a party of ten, in a motor-van, left Melbourne at 6 a.m., on December 27, travelling along the Prince's Highway, from which, at Fernbank, a divergence was made north-west, via the Dargo road.

Near Iguana Creek, Mr. Waller, a new member of the Club, showed the way to the camping-place, some miles distant on a quickly-rising road, by which, in about seven miles, we ascended 500 feet. Reaching camp at 8 p.m., the party settled down. Sleeping accommodation was found in a bark hut, kindly placed at our disposal by Mr. Waller, the motor-van, and Mr. V. Miller's tent.

At daybreak we were awakened by a hearty vociferous welcome from all the many district Kookaburras, perhaps in recognition of the Club's recent verdict in favour of the species generally! The camp was pitched on the rise of a hill commanding a good prospect on every side, 90 per cent of the original timber around being in dead or fallen trunks. We were about half-a-mile from the upper part of the creek, and two miles from the Mitchell Gorge. Eastward we could see Mounts Taylor and Lookout, near Bairnsdale; west of us, the peaks of Yellowman's Nob and Davy's Nob, off the Dargo track; southward, below the hills, was the plain country of Glenaladale and Fernbank; while to the north stretched generally the eastern ranges of the Mitchell watershed.

A walk of a milk and a-half over the dry, grassy hills, amid the gray trunks and fallen timber, brought us to an elevated hill, from the side of which we could overlook the Deadcock Gorge. A steep descent was here made, bringing us to a shelf of rock, about 20 feet high, across the creek, the cliffs rising on either side in hundreds of feet of tabular blocks of sandstone varied in colour; boulders, "confusedly hurled," occupying the creek's bed, amid which grew in great profusion a distinctive vegetation of a type foreign to the uplands, and characteristic of the rich jungle growth of Eastern Gippsland valleys; here, probably invasive or residual, but securely protected by the depth and narrowness of the gorge. The wearing away of the softer layers of rock overlaid by hard courses of sandstone or grit, has left rock caverns or shelters invitingly attractive to the wanderer, and forming an ideal camping-place.

Firmly rooted in the gorge were Kanooka, *Tristania laurina* (in yellow bloom), *Pittosporum undulatum*, the Currajong, *Brachychiton populneus* (in bud and flower), the Mock Olive, *Notelæa longifolia*, the Blackwood, *A. melanoxylon*, and the Lilly-pilly, *Eugenia Smithii*, vigorously growing and raising their heads, some from 70 feet to 100 feet, at heights unknown in a less congenial environment. These were the chief trees, with shrubs of *Phebalium squamulosum*, in full flower; *Goodia lotifolia*, *Pimelea axiflora*, *Lomatia longifolia* (in bloom), *Senecio velleioides*, *Daviesia latifolia*, *Cassinia aculeata*, *Correa Lawrenciana* (in flower), *C. speciosa*, *Kunzea peduncularis*, and *Coprosma Billardieri* (in fruit). Among this vegetation, but chiefly overhead, jungle climbers of Eastern mountain valleys, "this way and that, in many a wild festoon ran riot." Here were the common Appleberry, *Billardiera scandens*, the small Clematis, *C. microphylla*, *Calystegia sepia*, and the Twining Glycine, up to the cable-like trunks of the constricting Supplejack, *Rhipogonum album*, *Smilax australis*, Big-leaf Vine, *Sarcopetalum Harveyanum*, Wonga-vine, *Tecoma australis*, the Twining Silk-pod *Lyonsia straminea*, and others; some of which, with leafless stems, reached to the topmost branches of the trees before assuming foliage, or hung in looped swings or rope-like entanglements in or among the stately trees.

Owing to the dryness of the season, there was very little water in the creek, but sufficient moisture in the Gorge to give everything a verdurous appearance. The effect of encrusting mosses, ferns, and lichens on hoary trees and rock surfaces must be wonderfully enhanced in winter and spring, when water is flowing freely through the rocky gorge. From this sequestered spot a short walk brought us to the Mitchell River, the creek's mouth being practically hidden by the rocks and a thick tangle of scrub, chiefly Kanooka, which, with a low-branching habit and roots fantastically twisting about the boulders of sandstone or conglomerate, is the prevailing vegetation along the river-course, Musk, Lilly-pilly, Blackwood, *Callistemon Sieberi*, and the Manuka, *Leptospermum scoparium*, etc., being less common.

The Mitchell Gorge, extending past Cobannah Creek upwards, and down the stream for some miles, is wild and precipitous, cliffs rising on one side or the other, or on both in nearly horizontal layers of irregularly jointed siliceous conglomerates, sandstones, shales, grits and felstones to varying heights, here about 600 feet, to the timbered hills above. The rock faces vary in colour to deep red, with weathered cave openings here and there, and occasional trees perched perilously on abrupt ledges yielding scanty foothold.

A fine current of clear water flows musically over rapids, there with a more placid surface, delightful for bathing and narrowing here and there with the density of the enclosing rock substance, never very wide in extent, the lowering crags occasionally being relieved by dense vegetation at their base, where a bank of detritus or a projecting talus of fallen rocks, with silt accumulations, has been formed, giving a foothold above the water-level for plant growth.

According to the survey made 50 years ago by the late Dr. Howitt, the geological formation of this area is that of the Iguana Creek beds of the Upper Devonian period, marked broadly by thick layers of coarse siliceous conglomerates, grits, sandstones, and felstones hard and compact in character, the softer shales often wearing out into cave holes or recesses. Dykes of basic igneous rocks are occasionally intrusive in the stratified layers, altering their texture.

A pleasant day was spent here at the Mitchell. A very pleasing feature of the river is the unceasing musical calling of a large colony of Bell-miners. No aquatic birds were seen, except a lonely Black Duck; but the Sacred Kingfisher and the Azure Kingfisher were noticed.

On Thursday we essayed Deadcock Creek from opposite the camp, passing numberless rabbits on the way. The creek had intermittent pools of water, discoloured by vegetable matter, and was difficult to follow, owing to the close nature of the scrub, consisting of *Phebalium, Tristania, Daviesia, Hymenanthera, Helichrysum, Callistemon, Coprosma,* tussock-grass and creepers, along its course. The ferns were *Adiantum, Blechnum,* etc., and occasionally an *Alsophila australis.* After travelling some time under difficult conditions, we left the creek, and went over the hills to the Mitchell.

Entering the Deadcock Gorge by the steep valley at the first cave-formation, before-mentioned, we went up the rocky bed in the cool shade of its characteristic vegetation, to the second rock-shelf, about 30 feet in height, right across the gorge. A dark pool in front of it reflected verdure and cliff overhead. This imposing shelf of jointed layers of sandstone overlies the softer and redder shale beneath, which has been washed out by water action, leaving a cave about 150 feet in length, and extending from 30 feet to 40 feet from the front. At the back is a layer of fine, white, and dry sand. Water percolating slowly from above through strata evidently containing lime, holds it in solution, and by slow deposition forms stalactites beneath and at the edge of the roof, and stalagmites on the floor of the cave. On one side of the cave a supporting limestone pillar, or buttress, thus formed is specially noticeable. It was interesting to see, at some spots where the steady drip of water occurs, that stray fronds and stems of bracken within reach of the spray were coated with a layer of lime, giving a frosted appearance to the leaflets. (See *Naturalist*, Vol. XXXVII., p. 35.) The sides of the enclosing cliffs rise up 400 feet or 500 feet, forming, with the high rock shelf, a perfect *cul-de-sac*, from which there is no outlet upstream without climbing a tree or improvising a ladder, such as that of Howitt's blacks, 50 years ago. (See *Naturalist*, Vol. xl., pp. 77-9). Above the mantling shelf is a succession of receding ledges of rock, like broad pavement steps, and the creek gradually widening and rising fast becomes much less precipitous, and opens out into scrub, and then forest country.

The towering cliffs, the beautiful, lofty trees, the striking features of the cave, the "Nargun's Den," the twisting lianas, the attractive beauty of the setting, with its strangeness and harmonious blending of color and form, compose a picture that can only be imperfectly described, but will long live in memory. It is unique, a place apart, a restful retreat, secure in its situation from storm or devastating fire affecting the hills above. There is no evidence of fire having invaded the Gorge from the fire-swept surfaces overhead. The Gorge provides refreshing coolness, shade and water, so that birds come there from the heat of the upper air. Bell-miners haunt its entrance, Bronze-wings its rock-bound pools. The Wonga Pigeon rises in whirring flight, Lyre-birds frequent its covers, Gang-gang Cockatoos feed on the tree-tops; and smaller birds rejoice in its sheltering groves.

Next day, crossing the upper scrubby part of Deadcock Creek, we went north-east over a steep ridge, into Bull Creek, and under the shadow of the umbrageous trees followed it down to the Mitchell river. Here again, hemmed in by sheer towering rock-faces, the vegetation is most luxuriant and distinctive, and this gorge, similar in features, is scarcely inferior to the other, evoking our warm admiration and delight. It, too, has its steep declivities, stalactitic processes, calm pools, and the combination of rugged grandeur, softened by luxuriant variety of plant life.

These gorges, aloof from their surroundings, are natural sanctuaries worthy of the closest preservation. In them we get the furthest western limits in Gippsland of such north-eastern plants as the Currajong, the Kanooka, and the lianas of the East, in robustness of growth. One *Tristania*, with gnarled trunk, at 3 feet from the ground, was 16 feet in girth, and about 70 feet in height. Above the gorges on the ranges the vegetation is characterless, Stringy-bark, Red Box, Common Peppermint being the chief Eucalypts. *Xanthorrhœa hastilis*, the Spear-grass tree, was abundant. Eucalypts hardly penetrate into the gorges. Birds were numerous, tuneful, and objects of great interest, 48 species being noted.

It was amid the musically-swelling tintinnabulation of the Bell-miners and the rich full-throated song of the Grey Shrike-thrush, that we made our last ascent up the steep hill overlooking the Mitchell; while around our camp birds were always present—Yellow-tailed Thornbills chirping in a large fallen limb adjacent to the tent; Wood-Swallows assembling on dead trees, Wrens, Finches and tree-creepers close at hand. At early morn we could hear young Kookaburras and Magpies being fed by parent birds; Parrots, Magpie-larks, and other birds joined in the musical medley. Messrs. Hughes and Miller located a family of three Frogmouths at a short distance from the camp, and nests of several birds were seen. No Sparrows, Starlings, or Blackbirds were in the vicinity. Of other fauna, Wombats and Foxes have good cover in the gorges, and Wallabies frequent the timbered hill slopes.

On Monday, January 9, the party left camp at 6 a.m., and without incident reached Melbourne at 6.30 p.m., fully satisfied with their outing. Their best thanks are due to the Messrs. Waller and Mr and Mrs. Du Ve, for kindly assistance and guidance.

At the week-end we were glad to welcome a fellow-member, Mr. E. Cox, of Bairnsdale, who, through illness, at the last moment had been unable to join the party. The comfort and convenience of the party were assured by the appointment of our versatile member, Mr. V Miller, as quartermaster and first chef, his services being much appreciated.

In regard to insects, Mr. W. H. Rogers reports:—"The trees round the camp being nearly all ringed, and the country having been swept by fire last year, the locality was not very favourable for insect collecting. Five species of butterflies were noted, and several handsome blue-and-black dragonflies were taken in the Mitchell Valley. The larvae of the Imperial Blue butterfly were found in considerable numbers, and specimens were successfully bred therefrom."

EXCURSION TO BOTANICAL GARDENS.

The pleasant change in temperature experienced on January 15, no doubt accounted for the large number of members who met at the Botanical Gardens to add to their knowledge of aquatic zoology. Although naturalists have been collecting in the lakes in the Gardens for many years, there is always something interesting to find there—and the recent excursion was no exception to the rule. Perhaps the most interested members of the party were the juniors, some of whom were seeing pond animals for the first time, and it was delightful to see the interest they took in them. The intelligent questions asked as to habits, etc., enabled the leader to give little talks on the life-histories of dragon-flies, May-flies, water boatmen, and other insects, as the net brought specimens of them to view. One child was particularly delighted when she captured a female *Xiphocaris*, carrying a load of eggs, and did her best to remember its name.

As usual at this time of the year, the lake was filled with *Volvox*. These beautiful crystal spheres, dotted with emerald green, were much admired when viewed through a pocket lens. As usual, also, when *Volvox* is much in evidence, the parasitic rotifers, *Proales*, were very numerous—fully 10 per cent. of the *Volvox* colonies that I examined, contained one or more of the rotifers or their eggs. *Euchlanis* sp., *Asplanchra* sp., *Rotifer vulgaris*, and splendid clusters of *Lacinularia elliptica*, were the other rotifers noted. Entomostraca were not numerous, *Boeckella symmetrica* and *Cyclops albidus* were the only copepods identified, and *Simosa gibbosus Mionadaphnia* sp., and *Pleuroxis* sp., were the only Cladocera. *Plumatella repens* was found on submerged bamboo canes.

The following specimens have been identified:—

Crustacea—Caridea:—*Xiphocaris compressa*, *Xiphocaris* zoaea.
  Copepods:—*Boeckella symmetrica*. *Cyclops albidus*.
  Cladocera:—*Simosa gibbosus*, *Pleuroxis* sp., *Mionadaphnia* sp.
Polyzoa:—*Plumatella repens*.
Rotifera:—*Euchlanis* sp., *Asplanchna* sp., *Rotifer vulgaris*, *Lacinularia elliptica*, *Proales parasitica*.
Insect larvae:—May-fly, Caddis-fly, Dragon-fly, *Chironomus*, *Ceratopogon*.
Protozoa:—*Volvox*, *aureus*, *vorticella* spp., *Epistylus*, *Stentor*, *Thuricola*.
Aquatic Botany:—*Spirogyra*, *Azolla*, *Wolffia*, *Vallisneria spiralis*, *Elodia canadensis*.

—J. SEARLE.

NOTES ON THE COLEOPTERA OF NORTH-WESTERN VICTORIA.

Part XIV.

BY J. C. GOUDIE.

CHRYSOMELIDÆ.

This family, abundantly represented in Australia, comprises a large division of Coleoptera, over 900 species being recorded in Master's Catalogue. They are leaf-eating beetles of small size, rarely exceeding half an inch in length. They are diurnal in habit, feeding chiefly on the tender foliage of young eucalypts and wattles.

CRYPTOCEPHALIDES.

6273. *Lachnabothra wilsoni*, Baly.
6298. *Elaphodes vulpinus*, Suffr.
Ditropidus apicipennis, Lea.
6320. *Ditropidus concolor*, Snd.
6324. *Ditropidus cuneatus*, Chp.
6326. *Ditropidus davisi*, Snd.
Ditropidus frater, Lea.
6385. *Ditropidus splendidus*, Chp.

The genus Ditropidus contains a large number of smooth, shining beetles, of small size. They feed on acacias, appearing sometimes in considerable numbers.

Coenobius binotatus, Lea.
6412. *Cadmus crucicollis*, Boisd.
6414. *Cadmus excrementarius*, Suffr.
6418. *Cadmus histrionychus*, Chp.
6426. *Cadmus ornatus*, Chp.
6431. *Cadmus rugicollis*, Gray.

The species of Cadmus are about 1-3rd of an inch in length, and rather stoutly built.

6413. *Brachycaulus ferrugineus*, Fairm. Light brown, with darker markings, "prothorax with three velvety-black spots, surrounded by pale rings, one on disc, and one on each side."

6460. *Cryptocephalus carnifex*, Suffr. Bright red, underside and legs black; may be a var. of *haematodes*, Boisd., but if so, deserves a name.

6461. *Cryptocephalus castus*, Suffr.

Cryptocephalus comptus, Lea. Dark red, with base, suture and broad preapical band blue.

6473. *Cryptocephalus erosus*, Snd. Yellow; front of prothorax marked with black, elytra thickly speckled with black spots.

Cryptocephalus metallicus, Lea. Uniform dark metallic bronze-green.

Cryptocephalus scabiosus, Lea.

6474. *Cryptocephalus eruditus*, Baly. Proth red, elytra blue, with a V-shaped red mark on suture.

6488. *Cryptocephalus pœcilodermus*, Chp. Yellow, proth and elytra strongly and closely punctate.

Schizosternus. One species, undetermined.

6523. *Loxopleurus atramentarius*, Chp. Black.

6524. *Loxopleurus auriculatus*, Suffr. Black, subhumeral lobes of elytra distinctly marked yellow or white.

Loxopleurus pollux, Lea. Black, prothorax red.

SUB-FAMILY EUMOLPIDES.

Represented in this district by the genera *Tomyris*, *Rhyparida*, *Edusa*, *Cleptor* and *Rhinobolus*. These comprise a number of very handsome little beetles; brilliant metallic colours of green, blue, or coppery-red prevail among them. Some of the species occur in large numbers during the hot months, feeding on the tender shoots of eucalypts.

Tomyris aureoviridis, Lea.
Tomyris illaetabilis, Lea.
Tomyris laeta, Blackb.
Tomyris obscura, Blackb.
Tomyris rasa, Blackb.
Tomyris soror, Lea.
Tomyris tepperi, Lea.
Tomyris viridula, Er.
Rhyparida vagans, Lea.
Edusa distincta, Blackb.
Edusa hirta, Blackb.
Edusa multicolor, Lea.
6619. *Edusa suturalis*, Chp.
Cleptor goudiei, Lea.
Rhinobolus nitidus, Blackb.

SUB-FAMILY CHRYSOMELIDES.

Chalcolampra hursti, Blackb. This species is usually met with under stones or logs; it is shining bronze-black.

Calomela cœlestis, Lea. Beautiful dark-blue, shining; legs and flight-wings red. Found chiefly on *Acacia Oswaldi*.

6702. *Calomela ioptera*, Baly. Prothorax red, elytra purple, with blue or green shades, strongly punctate; taken on acacias.

GENUS PAROPSIS.

This genus contains a greater number of species than any other genus of Australian coleoptera. They are robust, very convex, smooth beetles of rounded oval form, and are found usually clinging to the leaves of low bushes, the shoots or suckers of eucalypts are especially favoured by them. Many of the species are beautifully coloured, but often the bright colours fade entirely after death, becoming a dull yellow or brown. Others are adorned with spots, bars or stripes of fixed colours. The larvae, which feed on the gum-leaves, are short, stout, grub-like creatures; they cluster together when young, afterwards separating.

6736. *Paropsis aenipennis*, Chp. Underside, parts of head, and margins of prothorax castaneous, remainder dark olive green. Quarter inch long. Taken on Myall, near Ultima.

6757. *Paropsis beata*, Newm. A smooth, shining black species 7-16th inch in length, having the margins of prothorax and elytra and three spots on each elytron red.

Paropsis confusa, Blackb.

Paropsis dryope, Blackb. One of our smallest kinds, measuring only ⅛ inch. Testaceous, with very variable black markings.

6836. *Paropsis intacta*, Newm. Yellowish - brown, striated, margins of elytra paler. Head and proth spotted black.

Paropsis mystica, Blackb. Brown, the elytra with two transverse yellow markings on each; about the size of *intacta*.

6880. *Paropsis nigrovittata*, Chp. An almost hemispherical species, ⅜ inch in length; Testaceous, elytra each with 10 longitudinal black lines.

6890. *Paropsis obsoleta*, Oliv. Reddish-yellow, elytra with three transverse rows of indistinct dark spots. 5-16th inch in length.

6930. *Paropsis roseola*, Baly.

6932. *Paropsis rubiginosa*, Chp. Green (some specimens turn red after death), elytra, each having 6 or 7 black spots. Length, 3-16th inch. This species, as well as *Paropsis dryope*, is found only on *Acacia hakeoides*.

6764. *Paropsis sublimbata*, Chp. Yellowish-brown, 3/8 inch in length. A dark blotch near outer margins of prothorax. Elytra with three stripes on each, besides the suture, black.

6990 *Paropsis variolosa*, Marsh. The largest Mallee species, being nearly 5/8 inch in length. Yellow, the elytra wrinkled and strongly punctate.

6988. *Paropsis variabilis*, Chp. Light yellow, 3/8 inch; parts of head, and a large blotch on shoulders of elytra, black. Elytra finely but distinctly striate-punctate.

In addition to the above, about nine species, which have not been identified, occur

HALTICIDES.

7023. *Arsipoda rugulosa*, Baly.
Arsipoda variegata, Blackb.
Haltica pagana, Blackb.
Hyphaltica mediocris, Blackb.
Plectroscelis tumbyensis, Blackb.

The Halticides have the hind pair of legs much longer than the others, and the femora enlarged; this enables them to jump with great agility. *H. Pagana* is dark shining blue; at Nyah, on the Murray, in January, 1926, it occurred in swarms, feeding on a plant growing in the lagoons.

GALERUCIDES.

7076. *Aulacophora hilaris*, Boisd. Known as the "Banded Pumpkin Beetle," it is a pest to gardeners, as it feeds on the leaves of melons, pumpkins, etc. During some seasons it has appeared in large numbers, causing great damage, not only to the melon tribe, but to other plants as well.

Adimonia elegans, Blackb. A rather handsome and rare species, about 1-3rd inch in length. Taken on the foliage of the Quondong.

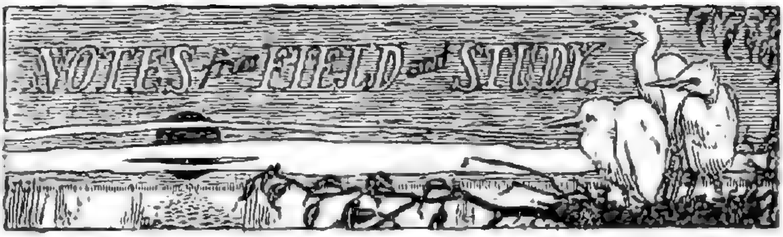
Ellopia sloanei, Blackb. An uncommon beetle, occurring among grass in swampy places.

Monolepta divisa, Blackb.
Monolepta modesta, Blackb.
Monolepta modesta, Blackb.; var. *angulata*, Bl.
Monolepta nigricornis, Blackb.

Small beetles having fairly long slender antennæ.

Monolepta nigricornis is black, with greenish-yellow prothorax.

Monolepta modesta has the prothorax red. *Monolepta divisa* has the head, prothorax and about half the basal part of elytra yellow, the rest black.


NOTES from FIELD and STUDY

INQUILINES FROM NEW SOUTH WALES.

Pheidoliphila minuta, Lea. This most interesting little beetle, an inquiline that lives with ants of the genus *Pheidole*, was first discovered by the late Mr. F. P. Spry, at Ferntree Gully, and has since been taken at Healesville, Beaconsfield, and in one or two other localities. Mr. Chas. Barrett recently brought back from Mount Victoria, in the Blue Mountains, N.S.W., some inquilines, among which I have identified this species, hitherto recorded only for Victoria. The specimen is a little smaller than Victorian examples before me, and is slightly more attenuated behind, but nevertheless agrees well with *P. minuta*.

Another interesting inquiline, also collected by Mr. Barrett at the same locality, is a form of *Chlamydopsis epipleuralis*, Lea. It forms a connecting link between typical *epipleuralis* and *C. sculptus*, Oke. It has the sculpture of *sculptus*, but the shape of the prothorax is as in *epipleuralis*. In my opinion, this indicates that *sculptus* is a var. only of *epipleuralis*, and not a distinct species.—F. **Erasmus Wilson.**

THE SHE-OAK SCALE.

Numerous specimens of the scale, *Frenchia casuarina*, were found on Casuarina trees at Yan Yean. Mr. C. French, Sen., who first brought it under notice, states that the She-oak scale is probably the most remarkable gall-forming insect in the world. It is born with six legs, two compound eyes, a pair of antennae and mouth-parts. Moving about freely, it attacks the bark of Casuarina trees, and forms a gall in which it is enclosed. A remarkable change then takes place. The eyes, legs, antennae, and mouth-parts disappear, and the shape of the body is entirely altered; it appears something like an inverted mushroom, with the stalk or tail projecting into the cylindrical tube-scale. At this stage the insect appears to absorb nourishment through the skin. It is in this stage also that the active six-legged young are produced. All the specimens discovered are females, the male, at the time the above description was made by Maskell, being entirely unknown.—A. E. **Rodda.**

BI-PINNATE FORM OF *LOMARIA DISCOLOR*.

In the January number of the *Naturalist* are some remarks regarding the bi-pinnate form of *Lomaria discolor*. It may be of interest to the Club to know that this form was first discovered by the late Mr. D. Boyle (I think in 1858), in the Dandenong Ranges. The second specimens were found by the late Mr. Taylor and myself at Macedon. Many years ago, I found more than 50 fine specimens, about 10 miles west of Drouin; many of these were presented by me to the Botanic Gardens, and other places. Some 10 years ago, the late Mr. R. Cheeseman raised a large number of specimens of this fern from spores obtained near Beaconsfield, where it was at one time fairly plentiful. I have seen dozens growing in many parts of Gippsland, and elsewhere. I note the generic change to *Blechnum*, and sometimes wonder whether finality in nomenclature will ever eventuate.—C. **French**, Senr.

TRILLERS IN TYERS DISTRICT.

I have not, until this year, either seen or heard Trillers (*Campephaga tricolor*) in Tyers district, yet at present (mid-January) they are fairly common. Three pairs are usually near our garden, and at least one nested in the orchard. It seems probable that we owe the honour of this visit to the unusual abundance of caterpillars of various species of moths, but chiefly, apparently, *Teia anartoides*. Caterpillars appear to constitute their sole diet, and on them also the young birds are fed. Not only are the Trillers, both male and female, graceful and beautiful, but their song adds a new delight to the music of the garden. Even as they were well named Caterpillar-eaters, so are they now as truly, and much more euphoniously, known as Trillers. The young birds are very fearless. Near the end of December, two children brought one to me, thinking it was hurt, as it remained so long beside them on the verandah, where they were playing. Carrying it to a cluster of shrubs where Trillers could often be seen, I opened my hand, and after a moment the little bird flew strongly to the top of an apple tree some yards away. Its mother appeared immediately, and we were able to watch her feeding it with caterpillars while we stood at the base of the tree.—J.G.

A GOOD WORD FOR WATTLE-BIRDS.

We found the notes on Red Wattle-birds (*Anthochaera carunculata*), at Sperm Whale Head (*Naturalist*, Dec., 1926), very interesting, especially as their ways, here, are quite different. As at Sperm Whale Head, we find these birds common only in the autumn, when apples and pears are ripening, although a few remain with us throughout the year, yet they never seem to be very pugnacious, and although a pair has been about our house since early spring, we have noticed the number of species in the orchard and garden (about an acre of ground) increase rather than decrease. I see about 20 species in that area every day.

On December 30 a Wattle-bird and a White-eared Honeyeater (*Meliphaga leucotis*) were feeding together, on nectar, in a flowering Fuchsia, while two species of Thornbills, Spinebills, Trillers, and a family of Blue Wrens, were present a few yards away. Daily, we see Black-faced Cuckoo-shrikes, Friar Birds and Kookaburras, all careless of the presence of the Wattle-birds, though the Kookaburras are always hunted away by a pair of Black-and-White Fantails, which are now (January 10), guarding their second brood.

The presence of the Wattle-birds has not prevented Trillers, Grey Fantails, Black-and-White Fantails, Wood-swallows, and Pardolotes from nesting about the house this season; and we are sure, though we have not discovered them, that Blue Wrens and Spinebills also built their homes here. I have never seen Wattle-birds about my food-tray, but have lately had to stop putting food there, as it attracted so many sparrows. Most of the smaller birds seem better pleased by flowering shrubs, which provide them with honey and insects, and a shallow dish kept always filled with water, in a shady corner. It is possible that honey-eaters would be more pugnacious in comparatively open, heathy and Banksia country than here, where tall Eucalypts, dense Lightwoods and English shade-trees, as well as fruit trees and flowering shrubs, native and exotic, provide close cover. Certainly the difference in the habits of Wattle-birds in two localities is very interesting.—(MISS) J. GALBRAITH.

The Victorian Naturalist

VOL. XLIII—No. 11. MARCH 7, 1927. No. 519.

THE FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held on Monday evening, February 14th, 1927. The President, Mr. E. E. Pescott, F.L.S., occupied the chair, and about 100 members and friends were present.

CORRESPONDENCE.

From Mrs. F Wisewould, thanking the Club for its expression of sympathy on the death of her husband.

REPORTS.

Reports of Excursions were given as follow:—Warburton, Mr. A. E. Rodda; Botanic Gardens, Mr. F. Chapman, A.L.S.

ELECTION OF MEMBERS.

The following were elected as ordinary members:—Mr. W. G. Chisholm, 198 Albert-street, East Melbourne; Mr. H. Howard, "Quendon," Chapel-street, St. Kilda; Mr. W. H. McMillan, 21 Weigall-street, South Yarra; and Mr. John Mason, 8 Rowena-parade, Richmond. As Country Member:—Dr. R. S. Rogers, F.L.S., 118 Hutt-street, Adelaide, S.A.

GENERAL.

Mr. A. D. Hardy moved: "That the Secretary for Lands be written to asking that the Crown lands on Sperm Whale Head, referred to in previous correspondence, be declared a National Park, and that a committee of management be appointed." The motion was seconded by Mr. H. B. Williamson, and carried unanimously.

The President stated that the Committee felt that the time was opportune to introduce a new Club badge, and that a sub-committee had been appointed to make a recommendation as to a suitable form and design.

Mr. A. D. Hardy moved: "That the Club direct the attention of the Chief Secretary to the danger to human life, and to the destruction of native birds and animals occasioned by the use of the pea rifle, and that he be asked to prohibit altogether the sale and use of this weapon."

Mr. C. French, Jr., seconded the motion, which was supported by Messrs. A. J. Tadgell and W. Ingram, and carried unanimously.

LECTURETTES, ETC.

Mr. J. Searle read a short paper descriptive of the various forms of aquatic life, from the Protozoa

(*Amœbæ*, etc.) to the higher forms (Frogs, etc.). A special display of microscopical slides and animal life in small glass aquaria, in the Upper Hall, greatly interested members and visitors.

EXHIBITS.

By Mr. E. E. Pescott, F.L.S.: Flowering specimen of *Dipsacus fullonum*, L., Fuller's Teasel, an introduced weed, the hooked "teasels" of which are used for putting a nap on cloth. *Leptospermum scoparium*, R. and G. Forster, var. *magna-rosea*, cultivated.

By Mr. W. H. Ingram: Pressed specimens of seaweeds, collected at Beaumaris.

By Mrs. Hodgson, on behalf of Miss Amy Fuller: Flowers from Mt. Victoria, Blue Mountains, N.S.W.;

By Mr. C. H. Borch: Butterflies and moths, collected during A.N.A. week-end, at Warburton, and including *Oreixenica correa* and *Heteronympha solandri*, usually found at altitudes from 4,000 ft. upwards. Case showing larva and moth of *Chelepteryx collesi*, taken at Edithvale.

By Mr. A. J. Tadgell: Dried specimens of:—*Muehlenbeckia Cunninghamii*, F.v.M., Tangled Lignum, from Sunbury; *Blechnum discolor* (Forst), Keys, Fishbone Fern, with rachis divided twice, and ends of pinnae four times, near Wandin; *Polygonum minus*, Hudson, Slender Knotweed, showing very small flowering specimen; *Alternanthera triandra*, Lam., Joyweed; *Erythraea Centaurium*, Pers., Common Centaury, introduced alien, hitherto often placed under *E. australis*, R.Br.

By Jas. A. Kershaw, for National Museum: Collection of Water Insects of the orders *Coleoptera*, *Hemiptera*, *Neuroptera*, etc.; also unusually large examples of the Fresh-water sponge, *Ephydatia fluviatilis*, from a dam at Doncaster, collected by Mr. A. O. Thiele, in June, 1921.

ALTERATION OF CLUB RULES.

Notice is hereby given that a Special Meeting of the members of the Club will be held on Monday evening, March 14th, at 7.45 p.m., to consider alterations of the Rules as under:—

That Rule 4 be altered to read—"The Club shall consist of—(a) honorary, (b) ordinary, (c) country, (d) life, and (e) associate members.

That in clause (b) the words, "Ordinary members may become life members on payment of twenty guineas in one sum" be deleted.

That in clause (c) the rate of subscription be altered from "twelve shillings and sixpence" to "fifteen shillings," and that the following words be added—"Provided that, where more than one member of a household shall become members of the Club, the additional member or members may pay an annual subscription of seven shillings and sixpence, which shall not entitle them to the Club's journal."

That the following be substituted for clause (d)—"Ordinary members may become life members on payment of twenty guineas in one sum."

That the present clause (d) be transferred to clause (e), except that the words "two shillings and sixpence" be altered to "five shillings" (in respect of additional payment for the Club's journal).

That clause (e) relating to Junior members as at present appearing in the rules be deleted.

That Rule 6 be altered to read, "Candidates for admission must be proposed and seconded by two members at one meeting, and elected or rejected by a show of hands at the ensuing meeting, one dissentient in ten to exclude; provided that, any member or members may demand that the candidates be balloted for, in which case a ballot shall be conducted, one black ball in ten to exclude; but no person who has been elected shall be entitled to the privileges of a member until his or her subscription shall have been paid, or while his or her subscription is in arrears."

That in Rule 11, the words "with the retiring President" be inserted between the words "who" and "shall."

That in Rule 16 the words, "All cheques shall be signed by the Treasurer and Secretary" be added.

COCKATOOS' AUTUMN FARE.

In the early days of the Morse's Creek goldfield, many miners, who held more than the recognised acre of land, planted hedges of white hawthorn, to take the place eventually of fences that in time would fall in decay. To-day some of those hedges are from 30 to 40 feet in height, and intermingled, as they are, with blackberry brakes, they form an impenetrable barrier, as well as a silent testimony to the foresight of the miners. These natural fences, when the berries are ripening, lure Gang Gang Cockatoos.

Every year flocks of Gang Gangs arrive, and strip every hedge of its jewels—red berries. Near my residence is a hedge about 300 yards in length, and I have made a point of studying the birds, and their methods of attacking the berries. They arrive with unfailing regularity, about the end of February or the beginning of March. I have noticed that generally one pair appears first; as the days pass, so the numbers increase.

At dawn, the call-notes of one or two birds are an indication that the flock is on the move, and soon the branches are bending beneath the weight of eager berry-eaters. The Gang Gangs keep up a constant chatter while cracking the kernels. About 8 o'clock they begin to return to the mountains, where they remain until evening, when again the hedges are visited. The birds are very tame, and take no notice of persons walking along the hedgerows. As one hedge is cleaned up, the flock moves off to another, and so on, day by day, until every hedge has been stripped clean of berries. The flocks disappear, and are not seen again in the district until early autumn in the following year. The interesting point is, where do they go, and how do they know when the hawthorn fruit is ripening?—W. H. GOLDSWORTHY.

AQUATIC LIFE EVENING.

When asked to arrange an "Aquatic Evening," for the February meeting of our Club, I thought it would be more interesting and instructive to visitors if, instead of providing haphazard exhibits, the specimens were arranged systematically, so that the relationship between them could be easily traced.

The exhibits begin with living specimens of *amoeba*, followed by ciliated forms, such as *paramoecium*, which are found in water containing decaying substances, sometimes in such numbers as to give the water a milky appearance; next came single-celled animals living in colonies—such as *Volvox*, beautiful crystal spheres studded with green, so plentiful just now (February) in the Botanic Gardens lake. These may be looked upon as a link between the single celled Protozoa and the many-celled animals, the Metazoa.

In the next group, *Porifera*, the sponges, splendid specimens were on view. I have seen people look incredulous when shown a living sponge growing on a submerged stick, and told that it was an animal. Little pockets in the sponge are lined with what are known as "collar-cells," from out of which long whiplike flagella wave. The movement of these flagella draw water through numerous pores into the sponge, where the particles of food contained therein are captured, the water passing out through larger orifices. Eggs formed in the sponge, develop into ciliated larvae, which swim about enjoying a brief free existence before settling down to the sedentary life of a sponge. There are also reproductive buds, called "gemmules," formed in the sponge, and these serve to carry it over periods of drought. When ponds dry up the sponges die, but the gemmules retain their vitality, and, when the wet season returns and the ponds are again filled with water, develop into sponges.

In the *Coelenterata* we have the first indication of a body-cavity, and see, thus low down in the scale of animal life, the stomach asserting itself. An example of Coelenterata is Hydra, an animal built up of two layers of cells. The only opening is the mouth, which is surrounded by five or more arms, or tentacles, which seize the food and press it into the mouth. The inner layer of cells absorb the nutrient part, the waste matter being rejected through the mouth.

The next higher group, the *Echinodermata*, has no representatives in our ponds and streams. Next comes a group of animals whose classification has caused a great amount of trouble, because of their great variety of form. The earlier naturalists dumped these all together, under the name Vermes. Any animal they could not fit in the other groups was thrust into this division. To-day the worms are separated into four divisions, or phyla, based on their shape. The *Platyhelminthes* were represented by the *Tricladia*, small planarian worms, sometimes very numerous; the *Nemathelminthes*, by *Gordius*, the long thread-worms so frequently found in water; and the Nematodes, small wriggling creatures, that are continually trying to twist their bodies into the shape of the figure eight, "vinegar-eels," taken from stale vinegar.

The *Trochelminthes* include the Rotifers, of many shapes, single and in colonies, free-swimming and sedentary. They all have a ciliary wreath, from which they take their name of wheel-animals. One of the exhibits showed *Melicerta*, a tube-building rotifer, busily engaged making "bricks" and adding them to its dwelling. The *Annulata* division is represented in our ponds by the Leeches, and by small segmented worms. The *Molluscoida*, the Polyzoa, commonly called moss-animals, from their habit of growing on submerged branches, or stones. They are groups of animals living and working for the common good of the colony. The individual animal is called a polypide, and the branching tubular structure in which they live is called the *cœnecium* (meaning "common house"). The species are distinguished by the shape of the "statoblasts"—or resting spores, which, like the gemmules of the sponge, carry the life of the polyzoa over the dry season.

The crustacean exhibits ranged from the microscopic Copepoda, *Boeckella*, and the leaf-limbed Phyllopods, *Daphnia*, *Lepiduris* and *Branchinella*, up to the crab *Hymenosoma*, and the "yabbis," *Astocopsis*. Among the Insecta, exhibits illustrating life-histories—eggs, larva, pupa and imago—(living and mounted), of Beetles, Caddis-flies, Dragon-flies, *Chironomus*, *Culex*, and many others were shown.

The *Arachnida* was represented by the water mites, nimble little creatures of various form and brilliant colouring.

In the Mollusca we had living examples, also cabinet specimens of the shells of *Unio*, the fresh-water mussel, and the pond snails, *Physa*, *Limneae*, etc.

The highest phylum *Chordata*, was represented by frogs (with slides showing their development), and fish, *Galaxias* and *Anaperca*.

Every phylum of animals, excepting the *Echinodermata*, is represented among the inhabitants of our ponds and streams. Where possible, living specimens of each of these phyla were shown, the large specimens in aquaria, and the smaller species, also sections and parts of the larger ones, under thirty-two microscopes.—J. SEARLE.

EXCURSION TO EAST WARBURTON.

Twelve members took part in the excursion to East Warburton on January 29, 30 and 31, 1927. The programme for the first morning was to visit the O'Shannessy bridge, via the Aqueduct, but, owing to insufficient directions, the outward journey finished on a disused tram-track a considerable distance below the channel. Although the hillside had suffered severely from last year's fires, the vivid new foliage on the charred tree-trunks, the dense bracken covering the slopes, and the glimpses of the Yarra winding through its tree-clad valley below, amply repaid our exertion. In the largest gully passed, an extensive growth of Giant Mountain Grass, *Glyceria dives*, was noted. Several species of beetles and their larvae were found within a Termites' nest, but only two specimens of the rightful owners were seen.

In the afternoon a trip was made to Big Pat's Creek, and its junction with the Mississippi Creek. The formerly beautiful gullies of both these creeks have been badly ravaged by bush fires. The tree-ferns are recovering, but the dense scrub that formerly embowered them has disappeared, and the dead wood that litters the streams and banks is an offence to the eye.

Monday morning was heralded by a Kookaburra chorus, in which apparently a dozen birds took part. Other bird calls, not so familiar, rang through the great trees surrounding the house. A pleasant half hour was spent in examining the extensive fernery constructed between three of the house buildings. Nearly all the local ferns were represented, as well as some from distant parts, and all showed a hardy, vigorous growth in the heavy clay soil. Enquiries for an unspoilt fern gully revealed the fact that one, bearing the unlovely name of Deadhorse Gully, existed some two miles further up the road, and the excursionists were soon "en route." An interesting rock section, in a small roadside quarry, was examined. The dip, strike, and jointing of the Silurian rock were very clearly illustrated in the southern leg of a large anticlinal fold. The narrow entrance to Deadhorse Gully was almost concealed by a blackberry tangle. A descent of a few feet revealed a roomy space, shaded by tree-ferns, Hazel and Pittosporum, the latter shedding its scarlet, sticky seeds. A tiny stream trickled down the gully and filled a small circular basin with clear, cold water. A hundred yards further up, the tree-ferns were larger and denser, and the varieties of smaller ferns more numerous. Some fine fronds of the Batswing Fern, *Histiopteris incisa*, were noticed; filmy ferns veiled the trunks of the tree-ferns. The return journey to Warburton was made in the afternoon.—A. E. RODDA.

The Orchids of Victoria

BY EDWARD E. PESCOTT, F.L.S., F.R.H.S.

PART VII.

14. C. ALBA, R.Br. (white). "White Caladenia."

Stem fairly robust, up to 8 inches high. Leaf rather broad, hairy, robust. Flower usually single, large. Pedicel not slender, hairy. Perianth segments all white, rarely pink, spreading. Dorsal sepal broad lanceolate, erect at back of column. Lateral sepals and petals broad lanceolate, spreading, somewhat equally arranged. Labellum 3 lobed, broad, not clasping the column, or only slightly so. Column and labellum not barred as in *C. carnea*. Labellum with 2 rows of calli, and often tipped with yellow.

This rare white Caladenia may be mistaken for either a very large *C. carnea*, or a white form of *Glossodia major*. The two dorsal sepals and petals stand out like four outstretched fingers, and the dorsal sepal is not hooded. The colour is pure white, very rarely pink; the labellum may sometimes be of a very pale pink shade, with a pink tip. The pink forms often show a shade of heliotrope pink. This was first collected in this State at Mount Dandenong by Jack French, and subsequently at Ringwood.

It is recorded in *Flora Australiensis*, as a variety of *C. carnea*, Bentham remarking, "Flowers white. I can see no other difference."

Recorded from N.S.W. and Victoria. Flowers in September.

15. C. CONGESTA, R.Br. (crowded, referring to the calli.) "Black-tongue Caladenia."

Plant slender, somewhat hairy, sometimes glandular pubescent, 8 to 18 inches high. Leaf narrow-linear, slightly hairy. Flowers from pink to deep rose pink, 1 to 3 on slender pedicels. Petals and sepals covered with glandular hairs on the outside. Dorsal sepal shorter than lateral sepals, incurved or hooded over the column. Lateral sepals and petals elliptical-lanceolate, all spreading. Labellum on a long claw, lower half erect against the column, distinctly 3 lobed, the lateral lobes broadly acute, spreading, margins entire; middle lobe, oblong or narrow lanceolate, elongated, very narrow, margins entire, *covered with thick crowded dark-crimson, almost black calli*, covering the labellum to the incurved tip, at first in 2 rows. Column incurved, with wide wings, often blotched pink.

This orchid is variable both in colour and height. Sometimes the colour is very rich and deep. Sometimes the flower stem is quite short and slender. But the long labellum, crowded with the almost black thick calli-masses, is sufficient to differentiate it from all others.

It is recorded from all parts but the N.W., and from New South Wales, South Australia and Tasmania. Flowers in late spring, often in November.

One correspondent reports that in places where the pastures have been topdressed with superphosphate, a very considerable improvement has occurred in the orchid flowers, this being one of the species referred to.

18. C. ANGUSTATA, Lindl. (narrow). "Slender Caladenia."

Somewhat hairy, but variable in that respect. Leaf solitary, linear, slightly hairy. Flowers 1-3 usually white, sometimes pink, rarely red. Dorsal sepal recurved over column. Lateral sepals and petals narrow linear, spreading. Labellum short, 3 lobed, the lateral lobes often incurved. Terminal end of central lobe recurved. Calli in 4 rows, white, often yellow, sometimes irregular. Column like that of *C. carnea.*

I cannot see why this plant should be retained as a species, except to prevent future botanists re-classifying it, for "species-splitting" purposes. It certainly is very like *C. carnea* and *C. testacea,* and its forms readily merge into those species. Rodway says, "The species is doubtfully distinct from *C. testacea.*

It flowers from September to November, and is recorded from all parts of the State. It is also common in Tasmania.

17. C. TESTACEA, R.Br. (brick-red). "Musky Caladenia."

Plant slender, 6 to 15 inches high, slightly hairy. Leaf similar, narrow. Flower dark red or red on outside, very rarely brick red, glandular hairy, white or very pale pink inside, 1 to 5 on slender stems. Dorsal sepal erect, incurved and concave. Lateral sepals and petals spreading, sepals longer than the petals. Labellum on movable claw, forward half recurved; margins entire, except towards the tip, where they are slightly denticulate—labellum 3 lobed, lateral lobes small, short and blunt: calli in 4 rows, but sometimes irregular towards tip. Column widely winged and incurved, like that of *C. carnea*.

The *reddish brown, or dull brownish colouring* of these flowers, which are also numerous on the stem, distinguish it easily. It is nearly always very fragrant, giving out a *musky odour*, which again distinguishes it from other species, and which thus gives to it the vernacular name.

It occurs in all the Eastern States, including Tasmania, and flowers in October-November. Recorded from all parts of Victoria.

16. C. IRIDESCENS, Rogers. (Iridescent or rainbow coloured.) "Bronzy Caladenia."

Plant slender, 4 to 10 inches high, leaf narrow-linear, with clasping bract in middle of stem; all somewhat hairy. Flower solitary, rarely 2, rich dusky red, with iridescent golden or bronzy tints. Dorsal sepal erect, and much incurved over column. Lateral sepals and petals spreading, all glandular hairy on the outside. Labellum on short claw, 3 lobed, the lateral lobes clasping the column, with entire margins, and transverse red markings. Central lobe recurved and much crowded with long clavate calli, also on the margins, *the calli not being in regular rows*. Column incurved at its upper part, marked and blotched with red lines.

This is a beautiful and bronze red orchid, closely related to both *C. testacea* and *C. congesta*. It was first discovered at the Splitter's Falls in the Grampians by me in 1913; and a few days later was again collected by J. W. Audas, F.L.S. It is also recorded from the South. Flowers in September-October.

19. C. CUCULLATA, Fitz (hooded). "Hooded Caladenia."

Plant slender. Leaf narrow linear—moderately hairy, 6 to 10 inches high; stem quite slender. Flowers white, often pale green tinged, sometimes pinkish or pink. Flowers sometimes dull on the outside. Dorsal sepal quite abruptly incurved over the column. Lateral sepals and petals not so spreading. Labellum 3 lobes, lateral lobes blunt, wide, with clear margins. Calli on middle lobe in four rows. Column bent forward under the hood of the lateral sepal.

This species resembles *C. testacea*, and except for colours and the unfringed margins of the labellum lobes, which are fringed in *C. testacea*, is quite doubtfully distinct. Recorded from the south and east, and also from N.S.W. Flowers in September-October.

20. C. CŒRULEA, R.Br. (sky blue). "Blue Caladenia."

Plant very slender, 3-7 inches high, slighty hairy. Leaf narrow linear-lanceolate, slightly hairy. Stem slender, somewhat *wiry, purplish red.* Flower solitary, bright sky blue, rarely white. Petals and sepals lighter on outside, and somewhat glandular hairy. Dorsal sepal erect, blunt. Lateral sepals and petals nearly of equal length, petals narrower. Labellum on claw, broad. 3 lobed; lateral lobes clasping the column, margins entire, having darker transverse lines. Middle lobe much recurved, narrow, entire or slightly fringed, *calli yellow,* in two rows extending to tip. Column winged, incurved.

This dainty little blue Caladenia is readily distinguished from the next species by its dark, wiry stem, and the yellow calli. It usually grows in dry situations, and flowers in August-September. Recorded from all parts of the State except the N.W., and from all the Eastern States and Tasmania. Rodway says that the latter record is doubtful.

21. C. DEFORMIS, R.Br. (deformed calli). "Blue Fairies."

Plant not very slender, somewhat hairy, 3 to 8 inches high. Leaf solitary, nearly glabrous, linear lanceolate, almost as long as the stem. Flower solitary, deep blue, rarely white or yellow. Sepals and petals lighter on the outside; dorsal sepal erect, or rarely incurved, lateral sepals and petals somewhat spreading, broad, somewhat falcate; Labellum sessile, clasping column at base, not very definitely 3 lobed, *blue or purple, denticular fringed;* calli in from 4 to 6 irregular rows, crowded, *usually blue;* column incurved, winged.

This blue Caladenia is larger and more conspicuous than the former species. The green, somewhat stout stem, and the blue calli distinguish it clearly from that species. It is often found in clusters of several flowers, whose underground tubers are united. Albino forms are occasionally found, while A. J. Tadgell recorded finding a cluster of plants with yellow flowers.

It is recorded from all parts of the State; and is found in all the other States except Queensland. Flowers from July to September.

16. GLOSSODIA, R.Br.

(Tongue-shaped—like a tongue).

Sepals and petals spreading, nearly equal. Labellum sessile, undivided, margin entire, not fringed, without calli or glands or plates on the disk, but, at the base 2 (sometimes united); linear clavate calli or appendages erect against the column, and from half to nearly its whole length. Column erect, often incurved, 2 winged. Anther erect, 2-celled, the outer valves broad, the inner much smaller, the connective produced into a small point. Pollen masses, 4, granular.

Terrestrial herbs, usually hairy, with underground tubers. Leaf solitary, oblong or lanceolate, radical, from within a scarious (dry and membranous, not green) sheath, close to the ground. Flowers, 1 or 2, rarely 3, on an erect scape (stem), with a sheathing bract at or below the middle, and a similar bract under each pedicel. Flowers erect, blue or purple, rarely white.

The genus is endemic (limited to Australia.) There are 5 species, three of which are Western and two Eastern. These two species are found in Victoria. Both have blue flowers, and *G. major* is one of our commonest and best known species.

1. G. MAJOR, R.Br. (larger). "Wax-lip Orchid."

Plant slender, hairy, from 5 to 12 inches high. Leaf solitary, bright green, hairy, oblong or oblong lanceolate. Flowers, 1, 2, rarely 3; purple, rarely pale blue or white. Perianth segments, all wide, elliptic lanceolate, spreading, white or very pale purple at base, with purple dots. Labellum sessile, ovate-lanceolate, waxy, white and hairy at base; the recurved forward portion purple, glabrous, with entire margins, *having a purple sigmoid* (S-shaped) *appendage*, with a yellow two-lobed fleshy head, at extreme base. Column erect, incurved, broadly winged, especially at the upper part.

The "Wax-lip" orchid is often found in very numerous colonies. The tall plants and purple flowers being very distinctive and beautiful. It is often possible to collect hundreds in a small area. It is widely distributed all over the State. In the warmer and drier areas the purple coloring is very rich. In the Grampians, I, at one time, saw a colony of hundreds, all very pale, almost pale heliotrope pink. In these pale specimens, the basal dots to the sepals and petals are often absent. Records have been made of flowers having two labella. These can be classed as aberrant forms, or "freaks."

It is recorded from all the Eastern States and Tasmania; flowering from August to October.

2. G. MINOR, R.Br. (lesser—or smaller). "Small Wax-lip Orchid."

Plant dwarf, slender, hairy, the hairs sometimes being glandular. Stems not above 4 inches high; flower usually solitary, small, purple or purplish blue. Leaf lanceolate, small; a sheathing bract at middle of stem. Sepals and petals oblong lanceolate. Labellum waxy, about 1-3 length of sepals, broad, somewhat hairy at white lower half; upper half wide, spreading, *with two appendages at base*, clavate, yellow, flattened. Column broadly winged.

This smaller Glossodia may easily be mistaken for a small form of *G. major*. But the paired yellow appendages at the base of the labellum are very apparent and distinct in *G. minor*. This orchid is very rare in Victoria and has only been recorded from the East. A. G. Hamilton records that in some districts near Sydney, the flowers occur in thousands. Flowers in August-September. Recorded from the three Eastern mainland States.

17. DIURIS, Smith.

(Two tails—referring to the long lateral sepals.)

Dorsal sepal erect, rather broad, clasping the column at the base, upper part open. Lateral sepals narrow-linear, almost herbaceous, spreading or deflexed, parallel or crossed; petals longer than the dorsal sepal, ovate-elliptical or oblong, on slender claws. Labellum usually as long as or rather longer than the dorsal sepal, deeply 3 lobed, the middle lobe much contracted at base with 1 or 2 raised longitudinal raised lines along the narrow part. *Column very short*, the wings produced into lateral erect lobes, but not continued behind the anther. Anther erect, 2 celled; pollen masses granular or mealy.

Terrestrial glabrous herbs with underground tubers. Leaves narrow, few, rarely many, at base of stem, with a few sheathing bracts higher up. Flowers 1, 2 or several in a terminal raceme, large and conspicuous, white, lavender, purple or yellow, often spotted or blotched; lateral sepals often green and channelled.

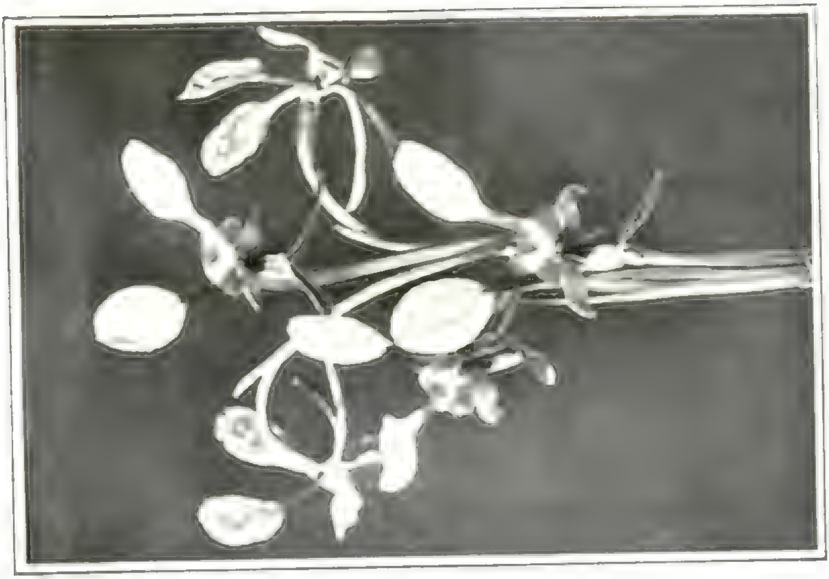
The genus is purely Australian, there being 25 species, occurring in all of the States. New South Wales has 17 species, Queensland 9, Victoria and South Australia 8, West Australia 7, and Tasmania 5.

Owing to the genus being so very readily distinguished by the long tails, i.e. lateral sepals, the descriptions will be here considerably reduced.

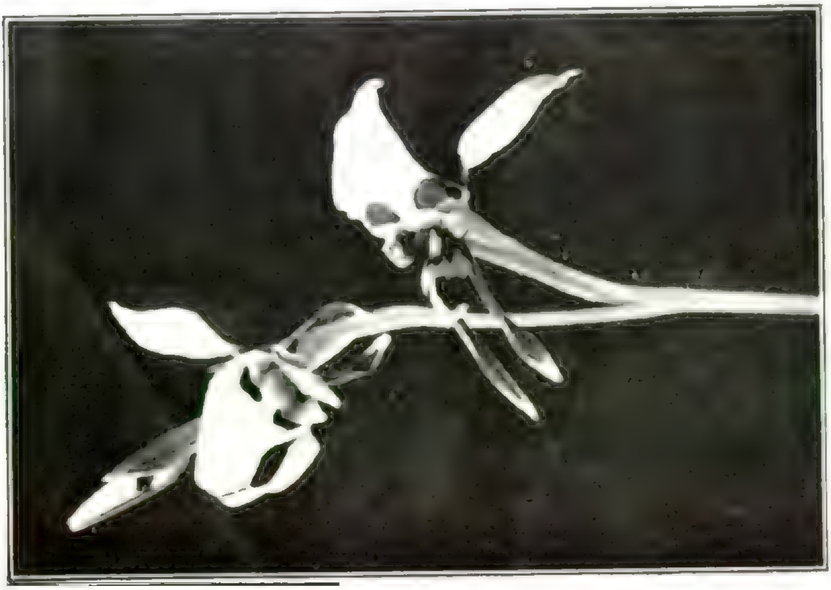
1. D. ALBA, R.Br. (white). "White Diuris."

Tall, leaves usually 2; lateral sepals much elongate. Flowers white or lilac, sometimes marked with purple; fragrant; Labellum having a raised central line between the 2 raised lines; central lobe wide, fan-shaped, often crenulate on margins. Lateral lobes of labellum very small.

Plate XIX.



DIURIS MACULATA, Sm.,
Leopard Orchid.



DIURIS SULPHUREA, R.Br.
Tiger Orchid.

This orchid is not always white, but is very variable in colour. Often in colonies where the plants grow, quite a considerable variety of shades and blotchings will be found. On that account (vide coloured illustration), some of the brighter forms may be taken for the next species.

Recorded from the 3 Eastern States. Found only in the S. and N.E., in this State, flowering in September-October.

2. D. PUNCTATA, Smith (dotted). "Purple Diuris."

Tall, leaves usually long, often only 2; flowers 2-5, heliotrope or purple. Dorsal sepal ovate, broad, large; petals long, spreading on a narrow claw. Lateral sepals very long, narrow linear, green, spreading, usually channelled, usually parallel. Flowers not blotched.

This light purple Diuris is always prized when collected, as it is one of our most beautiful of orchids. It often occurs in moist soil. The species name of *punctata* is a misnomer, for the flower is not spotted. The synonym given later, *D. elongata,* would be far more suitable, owing to the length of the tailed sepals.

Recorded from all parts of the State; and from Queensland, New South Wales and South Australia. Flowers in September to November.

3. D. PEDUNCULATA, R.Br. (stalked). "Snake Orchid."

Plant slender, glabrous; leaves 5-7 linear. Flowers medium size, 1-4 on slender pedicels, pale or canary yellow, rarely orange, often tinged with brown on outside. Dorsal sepal short, somewhat hooded over the column. Petals wide spreading, on green stalks. Lateral sepals free, green, parallel, channelled, not much longer than the labellum. Labellum flat, spreading almost widely heart-shaped, raised lines pubescent.

Called the Snake-flower by the aborigines. This orchid is often found in railway line enclosures in very large numbers. The canary or primrose yellow colour is very clear; and the flower is recognised also by its almost "squat" spreading habit. The "neck" of the stem just below the ovary is usually bent right over, giving the flower a downward facing.

Recorded from all parts of the State; and also from Queensland, New South Wales, South Australia and Tasmania. Flowers in August-September.

4. D. PALUSTRIS, Lindl. (Swampy). "Swamp Diuris."

Plants slender, not tall, from 4-6 inches high. Leaves 6-10, erect, narrow linear, often 2-3 the height of the flower stem; often channelled and bristly. Flowers small, 1 to 4 on long slender pedicels, yellow, blotched brown. Dorsal sepal ovate, dark coloured behind the anther; lateral sepals green parallel, longer than the labellum channelled. Lateral lobes of labellum erect; middle lobe oblong with 2 thick parallel fleshy raised lines, pubescent, merging into a single short raised line.

Usually found growing in moist or swampy locations. The abundant grass-like foliage, and the rather small, dull yellow flowers distinguish the species. It is sometimes aromatic-fragrant.

Recorded from all districts; and also from Queensland, New South Wales, South Australia and Tasmania. Flowers in August-September.

5. D. MACULATA, Smith (spotted). "Leopard Orchid." Plant moderately strong; from 8 to 12 inches high. Leaves 2-3 narrow lanceolate, channelled. Flowers up to 6; *yellow, irregularly blotched with brown, giving somewhat a purplish appearance,* the blotching being more marked on the back, than on the front of the petals and sepals. Dorsal sepal ovate, upright; margins sinuous or crenate; lateral sepals long, stout, somewhat broad, green, usually crossed when flower is fully opened. Petals conspicuously stalked, almost orbicular, much blotched on back. Labellum 3 lobed, lateral lobes, broadly crescentic, large, somewhat crenate; middle lobe somewhat saddle shaped in mature flower, the 2 raised lines being very prominent.

This is one of our commonest and widely spread Diuris. It is just as common in good woodland as in hard dry stony country.

It is recorded from all parts of the State; and from Queensland, New South Wales, South Australia and Tasmania. It flowers in August-September.

6. D. LONGIFOLIA, R.Br. (long leaved). "Tall Diuris." Plant usually stout, 4 to 18 inches high. Leaves 2 or 3, long, linear lanceolate, channelled. Flowers bold and large, 2 to 5, *yellow and brown in "wallflower" shades.* Dorsal sepal short, broad, somewhat semi-circular in general outline, pointed. Lateral sepals about twice as long as the labellum, green, stout, channelled, not often crossed, wider at end, giving a somewhat spoon-shape appearance. Petals stalked, upright, usually oval. Labellum widely winged, the lateral lobes being about equal to centre one. Middle lobe wide, with single raised line, very rarely double, at base of labellum.

Often called "Wallflowers" by children, this is a very conspicuous Diuris. It is one of our taller species, the brown and yellow shades merging into each other, and not being at all blotched.

Recorded from all parts of the State except the N.W.; and from all States except Queensland. Flowers in September-October.

7. D. PALACHILA, Rogers (spade shape-labellum.) "Broad-lip Diuris."

Plant slender, 4 to 12 inches high. Leaves 2-5, narrow. Flowers 1-3 on slender pedicels, yellow marked brown. Dorsal sepal yellow, with brown blotchings usually on back, short, bent forward over the labellum. Lateral sepals green, much longer than labellum, linear, channelled, parallel, occasionally crossed. Petals stalked, yellow, long oval, spreading. Labellum yellow, lateral lobes long, with dentate margins; *middle lobe distinctly spade-shaped*, spreading; 2 raised lines at base, merging to a central keel.

This species was for years collected as a yellow form of *D. maculata*. The broad spade-shaped labellum is its distinguishing feature.

Recorded from S.W., S., N.E., and E.; and also from New South Wales and South Australia. Flowers in September-October.

8. D. SULPHUREA, R.Br. (sulphur coloured). "Tiger Orchid."

Plant stout and somewhat robust, from 6 to 15 inches high. Leaves 2-3, long, lax or drooping. Flowers large, yellow, 3 to 6. Dorsal sepal ovate, somewhat bluntly pointed, recurved, *yellow*, with *two dark brown circular eye-like spots* at bottom. Lateral sepals much longer than labellum, acuminate, channelled parallel, occasionally crossed. Petals yellow, ovate, stalked. Labellum 3 lobed; lateral lobes wide, obovate, shorter than middle lobe; middle lobe wide, spreading, one raised line in centre lobe depressed at sides, a brown transverse blotch near tip.

This is to be distinguished from the South Australian species, *D. brevifolia*, by the single raised line on the labellum, as against two raised lines on that other species. The "eye" blotchings, and the clear rich yellow colour are characteristic. The buds are very pointed, sloping upwards, showing the brown dots very clearly before opening.

Recorded from all parts of the State except the N.W.; also from Queensland, New South Wales, South Australia and Tasmania. Flowers in October-November.

A NEW GREENHOOD ORCHID.

PTEROSTYLIS GRACILIS, N.Sp.

By W. H. Nicholls.

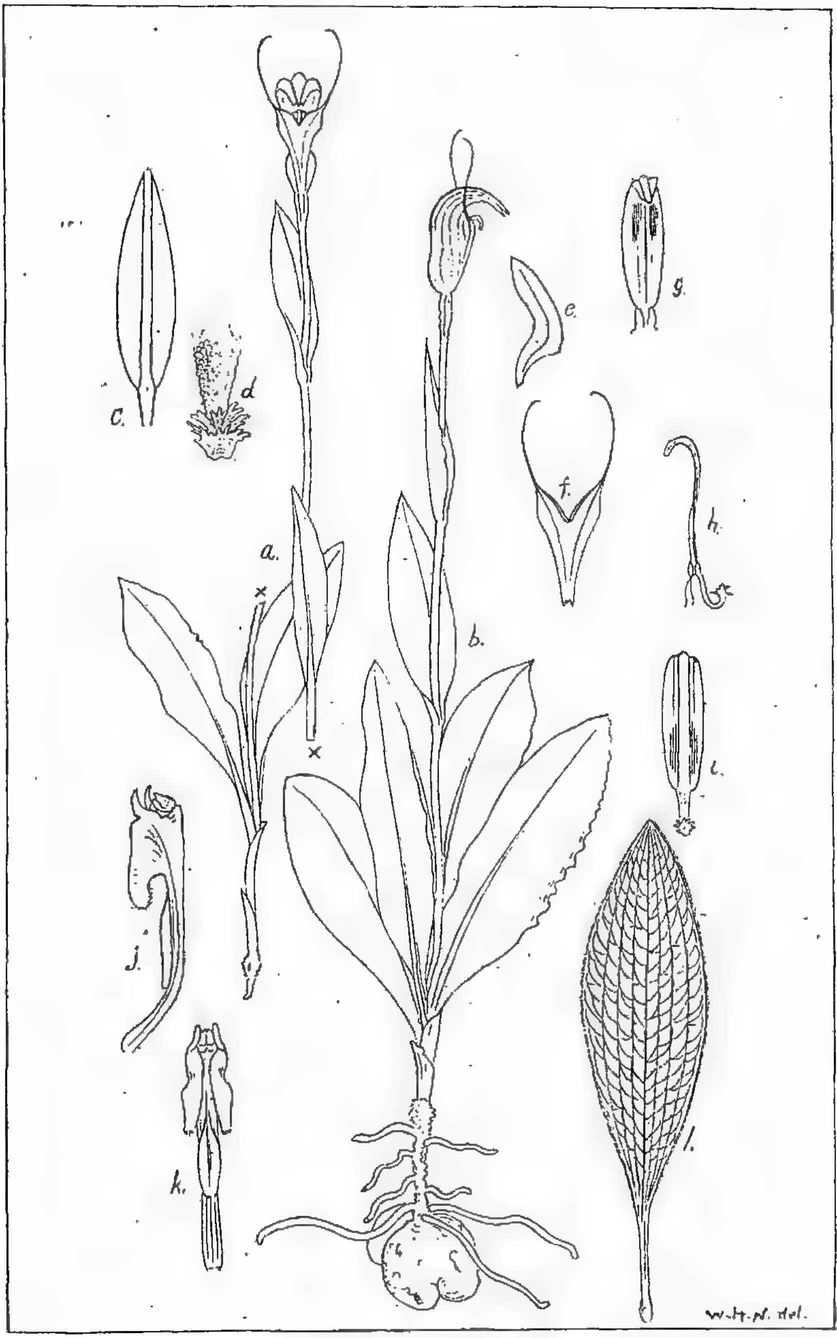
Planta glabra, gracillima, circa 12-30 cm. alta. Folia 2-3, grandia, ovalia vel ovali-lanceolata; petiolis gracillimis, sublongis, 2-9 cm. longa; caulina bracteata 3-4, sessilia, lanceolata, acuminata, 2-4 cm. longa. Flos solitarius, viridis, parvus; galea erecta, incurva; sepalum dorsale, petalaque lateralia, subaequalia, acuminata. Labium inferius, erectum, cuneatum, angustum. Labellum grande, oblongo-ellipticum, apice obtuso, decurvo; lamina circiter 12 mm. longa; appendix robusta, curvata, penicillata. Columna circiter 12 mm. longa, erecta; lobi superiores, lineares, acuti, inferiores, angusti, obtusi.

Stigma ovatum in medio columnae.

A very slender, glabrous species, from 12-30 cm. in height. Stem-leaves 2-3, varying in shape, but usually oblong-lanceolate; often large, from 2-9 cm. long. On slender petioles, margins sometimes crenulate. Stem-bracts 3-4, sessile, lanceolate, acuminate, clasping at the base, from 2-4 cm. long; the lowest, small and scale-like. Flower small, solitary, green, apex of galea, brownish, about 2 cm. in length (minus ovary). Galea erect, gradually incurved; the dorsal sepal and lateral petals, about equal in length, acuminate. Lower lip erect, very narrow, cuneate; the lobes prolonged into filiform points, embracing the galea, and exceeding it by about 8 mm. Labellum large, oblong- elliptical, projecting beyond the sinus, tip blunt, often much decurved; under surface of lamina slightly concave towards the tip, upper surface slightly concave towards the base; under surface traversed by a narrow furrow corresponding to the raised central ridge on the upper surface. Appendage stout, thickly and shortly penicillate. Column, slightly shorter than labellum; upper lobes of wings toothed, lower lobes, narrow, obtuse, inner margins, shortly ciliate. Stigma, ovate, point directed upwards.

August, September, October.

This species evidently is widely distributed, having been collected in Victoria and Tasmania. The following are the localities where it has, so far, been found:—*Victoria*: Fern Tree Gully (W. H. Nicholls and F. J. Bishop, Aug., 1923). Greensborough (A. B. Braine,



Pterostylis gracilis, n.sp.

Sept., 1925), Wilson's Promontory (Dr. R. S. Rogers and Mrs. E. Coleman, Sept., 1926), Healesville (Mrs. E. Coleman, Oct., 1926), Wandin (D. Blair, Oct., 1926). *Tasmania:* Devonport to Smithton, N.W. Coast, August, September, October, 1926 (the Ven. Archdeacon Atkinson).

The plant approaches somewhat closely *Pt. alpina* Rogers; but it is much more slender than that species, and the flower is very much smaller. The large leaves and the stout labellum are similar to those of *Pt. cucullata*, R.Br.; but in no other respects does it resemble that well-marked species. In the field, the new species has been mistaken, on first glance, for *Pt. pedunculata* R.Br., with which it is sometimes found growing; but the resemblance is only superficial; heightened, no doubt, by the dark colouration of the fore-part of the galea and the slender character of both plants. *Pt. pedunculata*, being much more slender, leaves strictly basal, stem-bracts smaller, also flower smaller, and the labellum of different shape—bluntly ovate. In some of the localities mentioned, it appears to be fairly numerous. The type is in the National Herbarium, Melbourne.

Since writing the above description, I have received pressed specimens of this orchid from the Rev. H. M. R. Rupp, the well-known orchidologist, of Paterson, New South Wales. He collected the specimens in Tasmania in three distinct localities:—Mt. Nelson, Oct., 1920; Cascades, Mt. Wellington, Oct., 1920; Cataract Gorge, Launceston, Oct., 1922. See notes on species of *Pterostylis*, H.M.R.R., *Proc. Linn. Soc. N.S.W.*, 1925.

KEY TO PLATE.

Pterostylis gracilis, N.Sp.

a—A typical plant, ¾ natural size.
b—A plant with large leaves, ¾ natural size.
c—Lamina of labellum, enlarged.
d—Appendage of labellum, much enlarged.
e—Lateral petal, enlarged.
f—Lower-lip from inside, enlarged.
g—Labellum, from below, enlarged.
h—Labellum, from side, enlarged.
i—Labellum, from above, enlarged.
j—Column, from side, enlarged.
k—Column, from front, enlarged.
l—Leaf of plant.

NOTES ON THE COLEOPTERA OF NORTH-WESTERN VICTORIA.

Part XV.

By J. C. Goudie.

Erotylidæ.

Thallis australiæ, Lea. One of the fungus beetles, so called because the larvæ feed in the fungi found growing on the trunks of trees, or on logs.

Coccinellidæ.

The more typical species of this family are our well-known "lady-birds," so common in gardens everywhere. Being carnivorous, both in the larval and perfect stages, they render great service by devouring the aphides and scale-insects that infest many plants.

7156. *Coccinella transversalis,* Fabr. Head and front of prothorax yellow, rest of these parts black. Elytra yellow, with the suture, two bracket-shaped markings, and a spot near the tips black.

7153. *Leis conformis,* Boisd. A larger beetle than the preceding; bright yellow, or red, with eight black spots on each elytron. A noted destroyer of the Peach aphis.

7168. *Alesia frenata,* Er. Yellow, the hind part of head and prothorax and two small spots on the latter black; elytra, the suture, tips, a sub-basal spot, and a double stripe joined at both ends, black.

7172. *Orcus australasiæ,* Boisd. A handsome dark-blue species, with three yellow spots on each elytron.

Scymnus australasiæ, Blackb.
S. australis, Blackb.
S. meyricki, Blackb.
S. meyricki, var. *obscuripes,* Blackb.
S. notescens, Blackb.

These are very small beetles, found on thistles, docks, etc.

S. notescens is black, with a large yellow blotch on each elytron.

Burcolus nigripes, Lea. Dark-brown; outer margins of prothorax and a stripe on each elytron, red; found under bark.

Rhizobius boucardi, Crotch.

7179. *Novius cardinalis,* Mulsant. The economic history of this small red and black "lady-bird" has been often related.

SUPPLEMENTARY LIST.

The following additional species have been collected or identified since the publication of the earlier numbers of these articles.

CARABIDÆ.

78. *Gigadema bostocki*, Cast, var. *intermedia*, Gestro. Included in Part I. of this paper as *G. carbonaria*, Sl. (M.S.).

102. *Pheropsophus verticalis*, Dej.
7292. *Philophlæus ornatus*, Blackb.
7273. *P. pygmæus*, Blackb.
261. *Adelotopus cylindricus*, Chaud.
440. *Philoscaphus tuberculatus*, Macl.
501. *Clivina australasiæ*, Bohem.
505. *C. coronata*, Putz.
952. *Thenarotidius* (*Bembidium*) *gagatinus*, Macl.
7464. *Amblystomus* (*Thenarotidius*) *metallicus*, Blackb.
Sarticus dixoni, Sl.
Loxandrus australiensis, Sl.
7467. *Notophilus montanus*, Blackb.
7551. *Microferonia adelaidæ*, Blackb.
7567. *Tachys mitchelli*, Sl.
898. *Simodontus convexus*, Chd.
Pseudoceneus iridipennis, Cast.

DYTISCIDÆ.

1084. *Hyderodes shuckhardi*, Hope.

HYDROPHYLLIDÆ.

Cercyon quisquilium, Linn.
7637. *Ochthebius australis*, Blackb.

STAPHYLINIDÆ.

Polylobus longulus, Oll.
Calodera eritima, Oll.
Conosoma lateripenne, Lea.
1245. *Quedius iridiventris*, Fvl.
1253. *Q. semiviolaceus*, Fvl.
Philonthus discoideus, Grav.
1293. *Eulissus* (*Xantholinus*) *phœnicopterus*, Er.
1312. *Lathrobium mutator*, Fvl.
Procirrus dolichoderes, Lea?
1364. *Pinophilus æniventris*, Fvl.

PSELAPHIDÆ.

Articerus constricti cornis, Lea.
A. cremastogaster, Lea.
Ctenisophus longicornis, Lea.
C. nigropiceus, Lea.

SCYDMÆNIDÆ.

Scydmænus colobopsis, Lea.

PAUSSIDÆ.

Arthropterus howitti, Macl.
A. latipennis, Macl.
A. quadricollis, Westw.

HISTERIDÆ.

7862. *Teretrius basalis*, Lewis.

PHALACRIDÆ.

Litochrus lautus, Blackb.

NITIDULIDÆ.

Notobrachypterus lutescens, Blackb.
Haptoncura meyricki, Blackb.

COLYDIDÆ.

Ditoma perforata, Blackb.

CRYPTOPHAGIDÆ.

7999. *Cryptophagus affinis*, Sturm.

LATHRIDIDÆ.

8006. *Lathridius minor*, Blackb.
8013. *Corticaria adelaidæ*, Blackb.

SCARABÆIDÆ.

Bolboceras tenax, Blackb.
Automolus granulatus, Blackb.
Haplopsis viridis, Blackb.
2599. *Diaphonia xanthopyga*, Germ.

BUPRESTIDÆ.

Melobasis obscurella, Thoms.
M. nobilitata, Thoms.
2895. *Stigmodera piliventris*, Saund.?
2982. *Chrysobothris australasiæ*, Hope.
3021. *Neospades (Coræbus) chrysopygia*, Germ.= (*Cisseis dimidiata*, Macl.)

TRIXAGIDÆ.

3034. *Aulonothroscus elongatus*, Bonv.

MALACODERMIDÆ.

Laius cyanocephalus, Lea.
Carphurus myrmecophilus, Lea.
Helcogaster ceraticeps, Lea.
3440. *Balanophorus mastersi*, Macl.

PTINIDÆ.

Dryophilodes bifoveiventris, Lea.
D. eucalypti, Lea.
D. ubiquitosus, Lea.

ŒDEMERIDÆ.

Copidita sloanei, Blackb.

PEDILIDÆ.

Xylophilus mandus, Blackb.

BOSTRYCHIDÆ.

Xylion cylindricus, Macl.

CISTELIDÆ.

Hybrenia elongata, Macl.

CURCULIONIDÆ.

5228. *Belus brunneus*, Guer.
5240. *B. hemistictus*, Germ.
B. punctirostris, Lea.
5248. *B. scalaris*, Germ.
5251. *B. sparsus*, Germ.
Three species of *Belus* remain unidentified.
Laemosaccus instabilis, Lea.

Summing up, the list, now completed, yields a total of 45 families, 385 genera, and about 776 species. There is no doubt that this number would be largely increased by collecting in fresh localities, particularly to the west and north of the areas worked by myself. Mr. Chas. Oke, operating at Natya, Gypsum, and Lake Hattah, found many species not appearing in my list. But the "ungarnered grain" must be gathered before it is too late. The Mallee, like the "Sandringham Flora," with its interesting, often unique, inhabitants, is swiftly disappearing, and much remains to be done, in all branches of Natural Science.

I would like to acknowledge the generous assistance and encouragement which I have received from entomologists, both at home and abroad. It has been a great pleasure to work with them, and to each and all I tender my sincere thanks.

Caladenia praecox.—W. H. Nicholls writes:—"In the February issue of *The Naturalist*, Mr. Pescott remarks that "*C. praecox* might possibly be considered a variety of *carnea*." The two species are dissimilar. The facts are as follows:—*Cal. carnea*, Br. *D.S.* erect. *Col.* stout, with transverse red bands. *Lab.* stout, 3-lobed with transverse red bands; lateral-lobes broad and rounded; mid-lobe, fringed with a few calli; *Calli* on lamina *stalked* in 2 rows usually (up to 6 rows in occasional specimens) *not extending beyond the bend. Anther* with long point.—*Cal. praecox*, N. *D.S.* incurved, *forming a distinct hood;* thickly granulated. *Col.* slender, red blotched. *Lab.* narrow, hardly 3-lobed, margins deeply fringed, purple blotch near tip. *Calli stout, short, fimbriated heads;* 4 rows usually (up to 6 rows in occasional specimens) *extending almost to the tip. Anther* abrupt.

In a letter received from Mr. W. W. Froggatt, F.L.S., Entomologist to the Forest Commission, N.S.W., occurs the following passage:—"I have been collecting gall-making thrips for the last few years, and now have an expert in California, Dudley Moulton, describing the new species for me in our *Linnean Society, N.S.W.* They have some very curious habits. The gravid females of one we obtained from Gildandra, had the abdomen swollen like that of a queen white ant (Termite), and was the sole mother to a gall containing a thousand active larvae."—C.D.

EXCURSION TO THE BOTANICAL GARDENS.

A favorable change of wind, from a morning northerly to an afternoon southerly, on February 12, 1927, made the visit to the Botanical Gardens very pleasant to the 40 or more members and friends of the Club, including a contingent of nascent naturalists from Mornington, under the guidance of the Rev. Geo. Cox. The subject of the visit was to be a running glance over the wonderful collection of plants from all parts of the world which are especially interesting to plant geologists. We were particularly indebted to our Vice-President, Mr. St. John, for planning the easiest way to see what we wanted in the shortest possible time.

In the Museum, the foliage and seeds of the Maiden-hair Tree, *Ginkgo*, were examined, and it was explained by the leader how important this now single-specied group was in past times, to illustrate this, sketches of the foliage from Devonian, Triassic, Jurassic and Tertiary rocks were handed round. Other important fossil plant representatives, of the Fern-palms (Cycads), the Conifers and the Proteaceae (Banksias and Waratah) were illustrated by excellent Museum specimens, and then our walk through the Gardens commenced.

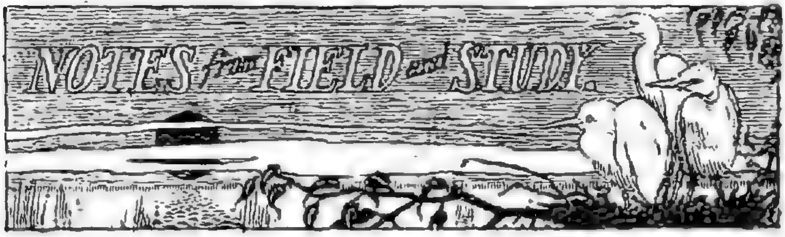
A fine Norfolk Island Pine, *Araucaria excelsa*, formed the subject of comments on the importance of this group, the Araucariae, in making up the bulk of the Wonthaggi coal seams, which, in the more shaly portions, show the cone-scales and fossilised wood, still identifiable, of these kinds of trees which undoubtedly formed extensive forests in Gippsland in Jurassic times.

The beds of Cycads, those plant anachronisms, made us reflect how old-fashioned they look among modern types, and what a curious aspect they must have imparted to the Jurassic landscapes, especially in England, where they are not now met with. To a geologist, this living collection is one of the glories of these Gardens.

Among the many other "living fossil" plants seen in the Gardens during the afternoon were the King Fern, with its fossil representative, *Osmundites;* the Sequoia of California, a marvel in longevity, with its 3,000 years of growth, and its fossil record of about 10,000,000 years; the Swamp Cypress (*Taxodium distichum*) of North America, which in past ages grew side by side with the Sequoias in the old Bournemouth forests of the South of England, but which, like the redwoods, are now only found in North America.

The group of the living Proteaceae in the Gardens drew forth comments on the former prevalence of the West Australian *Dryandra*, the *Banksia*, *Hakea* and *Lomatia*, in the old Tertiary forests of Australia, as far back as three million years ago; and the grounds were considered for supposing the former existence of a land connection between South Africa and Australia, countered by other theories of seed-drift and oceanic currents.

Romantic theories of former geographical connections were touched upon in the presence of some fine examples of the Strawberry Tree, *Arbutus unedo*, and the modest little London Pride, *Saxifraga umbrosa*. These plants seem to show a former connection of Ireland wth the Iberian Peninsula, for, beyond Southern Europe, they now grow only in the West of Ireland. Here, again, seed dispersal may account for their strange distribution. One could spend weeks, nay, months, in our beautiful Gardens, and still learn more and more of the fascinating history of our living plants.—F. CHAPMAN.


NOTES from FIELD and STUDY.

NOTES ON XIPHOCARIS COMPRESSA

The common little fresh-water crustacean, *Xiphocaris compressa*, found right through Eastern Australia, and as far north as Japan, is well known to aquatic zoologists. Yet, I think, the early stages of its life history have never been recorded. I first found the zoaea in the Richmond quarries, and exhibited specimens at a meeting of the Microscopical Society, in 1913 or 1914.

In 1917-18, a fortnightly examination of the micro fauna of the lake in the Botanical Gardens was carried out by Messrs. J. Shephard, Stickland and myself, and in the early summer months the zoaea, 2 mm. to 6 mm. in length, were found to be very numerous in the plankton. Attempts to breed *Xiphocaris* in indoor aquaria have been unsuccessful, and I think the reason for this was discovered during this period of examination of the lake fauna.

On one occasion, a female *Xiphocaris* was seen on an aquatic plant, right at the surface of the water. It was observed to hold on to the plant with its legs, ventral side uppermost. It then thrust its abdomen out of the water and began to move its pleopods slowly to and fro, so that the attached eggs had the benefit of a sun-bath. After these operations had been watched for some time, the hand-net was slipped under it, and the specimen deposited in a collecting jar. It was hoped that the well-developed eggs would hatch out; but after a day or two in the aquarium, the animal exuviated, discarding its eggs with its cast-off skin. I have known the same thing to occur before, and have come to the conclusion that an occasional sun-bath is necessary for the proper development of the eggs of *Xiphocaris compressa*.—J. Searle.

NEST ROBBERS.

The pilfering of nesting-material is not a common practice in Birdland, and I think that, when it occurs, the birds concerned are not aware that they are pulling a neighbor's home to pieces. The nest, to them, is like a mass of wool torn from the back of a sheep, and is regarded merely as a convenient supply depot. Some birds will return again and again to the same spot when gathering nesting material, and I have found scores of nests through this habit. The habit of pilfering is more commonly displayed by the Brown-headed Honeyeater (*Melithreptus brevirostris*), than other species I have observed, and I photographed two of the birds at a Black-and-White Fantails' nest. In spite of my efforts, and the angry attacks by the owners, the nest was eventually pulled to pieces, and the material used to construct the Honeyeaters' nursery.—L.G.C.

The Victorian Naturalist

VOL. XLIII—No. 12. APRIL 7, 1927. No. 520.

THE FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held on Monday evening, March 14, 1927. The President, Mr. E. E. Pescott, F.L.S., occupied the Chair, and about 85 members and friends were present.

CORRESPONDENCE.

From Under-Secretary for Victoria, stating that the Club's representations regarding the prohibition of the sale and use of the pea-rifle, would receive consideration.

REPORTS.

Reports of Excursions were given as follows:—Eltham, Mr. C. H. Borch; Worri Yallock, Mr. F. Chapman, A.L.S.; Zoological Gardens, Mr. L. L. Hodgson.

ELECTION OF MEMBERS.

The following were elected as ordinary members:—Rev. Robt. B. McConchie, Methodist Parsonage, Jupiter street, Caulfield; Mr. J. Clark, F.L.S., National Museum, Melbourne; Miss Mary Vinnicombe, 98 Wright street, Middle Park; and as Associate Member, Master Howard M. Bainbridge, University, Carlton.

GENERAL.

The Secretary stated that recently, Mr. E. Hanks had met with a serious accident. It was decided that a letter of sympathy be sent to Mr. Hanks.

The President announced that Miss F. Smith had recently suffered bereavement in the loss of her mother, and it was resolved that a letter of condolence be written to Miss Smith.

Notice of motion was given of the proposed alterations to the rules as published in the March "Naturalist." Mr. A. J. Tadgell gave notice of motion of the proposed addition to Rule 4, clause (b)—"Provided also that the Secretary and/or Treasurer shall, while he continues in office, be exempt from payment of member's subscription, but shall *ipso facto* be deemed a financial member of the Club."

PAPERS.

Mr. H. W. Davey, F.E.S., read a paper dealing with Japanese Newts, several living specimens of these creatures being exhibited in a large glass bowl.

Mr. J. A. Kershaw read a paper on "Australian

Snakes and Lizards," in which he described the distinctive markings, etc., of the various species. A number of excellent lantern slides was shown in illustration of his remarks.

EXHIBITS.

By Miss Raff, M.Sc., F.E.S.: Snake back-bone necklace.

By Zoology School, University (per Miss J. Raff): Crocodile hatching from the egg; cast skin of Lizard.

By Mr. A. C. Nilson: Specimens of Imperial Blue Butterfly, *Ialmenus evagoras*, bred from pupae taken on a wattle tree at Eltham on February 19. The female emerged about March 6, the male three days later. Fossil air-breathing snail, *Hercynella*, collected at Killara.

By P. R. H. St. John: Dried specimens of *Eucalyptus nova-anglica* (Deane and Maiden), "Red, or New England, Peppermint," collected by exhibitor at Bayswater, January, 1913, and at Killara, February, 1927; and by Mr. H. B. Williamson, at Antony's Cutting, January, 1915. New record for Victoria. Found also in New South Wales (1898), and Southern Queensland.

By Mrs. A. H. E. Mattingley, Sea-snake, killed on beach at Magnetic Island, Queensland. Tortoise eggs, laid in captivity.

TRILLERS' NESTING TRIALS.

A pair of Trillers (*Lalage tricolor*), having built their small and shallow nest in a Red Box, on a branch about 16 feet from the ground, and overhanging a clothes' line, near our house at Eltham, I had the opportunity of observing them closely. Arriving here in September with a large flock, the birds began to build on October 2nd or 3rd, both working at the nest; the male bird was seen shaping it. On October 9th I observed the male sitting on the nest. The three eggs were hatched out on the 23rd. The parent birds added bits of cobweb and other materials to the nest during the period of incubation. They were a very trustful pair, and soon became reconciled to a camera fixed on a wooden bracket close to the nest. The male could be touched with the hand.

Brooding was a duty shared, the birds relieving each other at intervals of 10 to 20 minutes. On October 30th, the nestlings were blown out of the nest, being found on the ground beneath it, dead. On November 5th the same pair of Trillers had started another nest, in a tree close by, using the material from the old nest. Before it was finished a gale blew it to pieces. I believe that a third nest was built in a tree in the next paddock, as the birds were about for a few weeks. Then, as the waterholes dried up, they went farther afield.—W. C. TONGE.

VICTORIAN REPTILES.

BY JAS. A. KERSHAW.

The following is an abstract of a lecture on Australian Reptiles delivered before the Club on March 14th, and by request is restricted to Victorian species of Snakes and Lizards. The two groups are represented in Victoria by probably not more than 70 species.

OPHIDIA, OR SNAKES.

Practically all Victorian Snakes are poisonous, though some are too small to be dangerous. The really deadly species are the Tiger, Black, Brown, Copper-head, and the Death Adder. Although some of these are fairly numerous in certain localities, death from snake-bite is rare. The only harmless Victorian species are the small, burrowing, Blind Snakes (*Typhlops*), of which there are seven representatives; and the Carpet Snake. The former are restricted to the dry and warm areas in the north and north-western parts of the State, where they burrow with great rapidity into the loose, sandy soil, and are frequently ploughed up. They are long and cylindrical in shape, the tail being as thick as the head, and furnished with a short, horny spine; while the body is covered in small, closely-fitting, and highly polished scales. The mouth is exceedingly small, the lower jaw toothless, while the rudimentary eyes are covered by scales and not easily discernable. These snakes are frequently found in Termites' mounds, where they find an abundant food supply. They eat insects, worms, grubs, etc.

In Victoria, with the exception of the Brown Snakes, all the venomous species produce their young alive.

THE CARPET SNAKE (*Python spilotes*, var. *variegata*) occurs, but is very rare in the northern parts of the State. It is common throughout the northern parts of Australia. It is, of course, non-poisonous, and, like all Pythons, crushes its prey, principally birds and the smaller mammals, in its coils before swallowing it. It attains a length of from 10 feet to 12 feet. Like most Pythons, the Carpet Snake lays about 30 eggs, which it protects by coiling itself upon them.

In Victoria, three species of Brown Snakes have been recorded, two of which are rare, and occur only in the northern parts of the State.

THE COMMON BROWN SNAKE (*Demansia textilis*), which is now practically restricted to the northern and western districts, at one time extended its range to the southern coast. Specimens in the National Museum were captured at Queenscliff, South Brighton, Heidelberg, and Footscray, while a young one recently was captured at Pentridge. This is one of the really dangerous species, and reaches a length of at least six feet. It lays from 15 to 25 eggs, which are deposited usually under a log or among dead leaves. The young do not resemble the adult, but are very pale-brown in colour, with a black patch on the head, separated from another black patch on the neck by an orange band. Frequently they are banded with black rings, extending from the head to the tail. Many examples have only two or three rings, while others have none at all. As the Snakes become full grown, these markings disappear.

THE BLACK SNAKE (*Pseudechis porphyriacus*) occurs throughout the eastern and south-eastern parts of the State. At one time it was found as close to Melbourne as Studley Park, but is now rarely met with except in the eastern parts of Gippsland. It is not found in Tasmania. Although specimens measuring seven feet, and even eight feet in length, have been reported to have been seen, it is very doubtful if this species ever much exceeds six feet. This dangerous Snake prefers damp situations, and readily takes to the water, where it can remain immersed for a considerable time. It is viviparous, bringing forth from 15 to 20 young ones.

THE COPPER-HEAD (*Denisonia superba*) is the commonest of all Victorian deadly Snakes, and the species most frequently met with. It is not nearly so vicious as the Tiger Snake, and does not show fight in the same way. It is still found within short distances of Melbourne, and is abundant throughout eastern Victoria, Tasmania (where it is frequently called the Diamond Snake), and on the islands of Bass Strait, and extends into southern New South Wales. Although this species is reported to grow to a length of between five feet and six feet, I have never seen one approaching that length. The usual size is from three feet to four feet.

The colour of the back varies from dark-brown to light reddish-brown—in some cases nearly black. The very dark specimens frequently are mistaken for Black Snakes, from which they may readily be distinguished by the scales on the underside of the tail being in a single row, instead of a few single, and the remainder double. The V-shaped marking on the back of the head, which, however, is always more prominent in young examples, also serves to distinguish them. Like the Tiger Snake, this species usually produces a large number of living young, up to about 30 at one time.

THE TIGER SNAKE (*Notechis scutatus*) generally is regarded as one of the most deadly of our poisonous snakes. It is certainly one of the most vicious, and when irritated, flattens and extends the skin of the neck to twice its normal width, and strikes at its enemy with remarkable quickness. It is very numerous, especially in the eastern and south-eastern parts of the State, and frequents both marshy and fairly dry localities. In the seventies it was common around Melbourne, specimens in the National Museum being recorded from the University grounds, Studley Park, Prahran, and other suburbs. In Tasmania, where it is known as the Carpet Snake, this species is very common; and it is spread over the greater part of Australia. In colour it is usually light brown, with a series of broad, darker, cross-bands.

Although sometimes confused with the Copper-head, the Tiger Snake may usually be recognised by the cross-bands, which are most pronounced just after casting its skin. The usual length of this Snake is from three feet six inches to four feet, though it is said ta reach between five and six feet. Its food consists largely of frogs and lizards, and occasionally young rabbits. The Tiger Snake is unusually prolific, and, according to Lucas and Le Souëf, produces as many as 50 or more young in a litter. The greatest number I have counted is 37. Like some other species, the Tiger Snake takes readily to water, and has been frequently seen swimming in creeks in Gippsland.

THE DEATH ADDER (*Acanthophis antarcticus*) is found, in suitable localities, in all the States, as well as in New Guinea and adjacent islands. It is short and thick, with a broad, flattened head, and a short, rapidly tapering tail, terminating in a pronounced spine. It rarely exceeds two feet in length, and varies considerably in the colour, which, to a great extent, is similar to its immediate surroundings. It is very sluggish, and will rarely make any movement, even when lying in an exposed position, unless interfered with, when it strikes with great quickness. It is found usually in sandy localities, and in Victoria, is restricted to the dry areas of the north-west. The spine on the tip of the tail is widely believed to be its sting. This species is one of the most deadly of our Snakes, though apparently not so venomous as the Tiger Snake.

THE WHITE-LIPPED SNAKE (*Denisonia coronoides*) is one of the most common among the smaller species. It grows to a length of from 12 to 15 inches, and is usually met with in open, heathy or grass country, particularly in the southern and eastern parts of the State. Usually, it is of a pale brown colour, and may be readily distinguished from all other species by the white streak along the upper lip, extending for a short distance along the side of the neck.

THE LITTLE WHIP-SNAKE (*Denisonia flagellum*), is also common in the southern districts, and often is seen within a short distance of Melbourne. It was formerly plentiful at Brighton, Caulfield, and Studley Park. Like the White-lipped Snake, it is practically harmless, although the poison fangs are present. It is brown along the back, and white on the underside. The crown of the head is black.

BLACK-AND-WHITE RINGED SNAKE (*Furina occipitalis*).—This small, and practically harmless snake, is one of the easiest to recognise, and cannot be confused with any other species. The whole of the body and tail is encircled with alternate bands of black and white. It is common near the Murray, and throughout the Mallee, and is never found in the southern districts.

Other small species, which, though rare and restricted to the north and north-western districts in Victoria, are more common in some of the other States, are—

Denisonia gouldii: about 15 inches in length, yellowish-brown above, with head and nape black, and the upper lip yellowish.

Denisonia nigrostriata: distinguished by the dark brown vertebral stripe. It is yellowish above, with the scales edged with brown, and the head dark brown above, and grows to 12 or 14 inches in length.

Rhynchelaps australis: a species only recently recorded from Victoria, which may be readily distinguished by its unusual colour and markings. It is red above, with a series of narrow, dark cross-bands extending from the head to the tip of the tail, and formed of yellowish, black-edged scales. On the head is a broad, black band, and another on the neck. Its length is from 9 to 12 inches.

THE YELLOW-BELLIED SEA SNAKE (*Hydrus platurus*).—This is the only sea Snake recorded from Victoria, and is quite an accidental visitor. So far as I am aware, only three or four specimens have been captured on our shores. It has a very wide range over the Indian and Pacific Oceans, and is common in the more tropical parts of Australia. In length it is usually from two to three feet, and is black or dark brown on the back, and yellow on the sides. The tail is yellow with black spots or broken bands.

Like all Sea Snakes, this species spends its whole existence in the sea, and does not survive long when brought ashore. It is viviparous.

LACERTILIA, OR LIZARDS.

In Victoria there are about 50 species of Lizards, or about one-eighth of the total number of the Australian species. Lizards are terrestrial reptiles, the majority of which have two pairs of limbs, well developed, and approximately of equal length. Some, however, have no external limbs, others have only the hind pair, while others again possess them in a more or less rudimentary state. Nearly all dwell on or near the ground, among rocks, or beneath the surface; some inhabit trees, while one species spends much of its existence in the water. There are no poisonous Lizards in Australia, in fact, the only known poisonous Lizard is the Gila Monster, of America.

Very few Lizards utter any cry; the majority make a hiss. A few, however, particularly the Geckos, utter a sharp and chirping cry, or a rather prolonged, plaintive note. The majority of the species lay eggs; some bring forth their young alive.

GECKOS.

These are nocturnal, perfectly harmless Lizards, which hide under bark of trees, stones, or logs, during the day, and hunt for insects. The toes, in some species, are furnished with sharp claws; in others, with adhesive discs, which enable the Geckos to run up and down smooth walls, tree-trunks, or even on window panes. The eyes are large, and covered, as in Snakes, by a transparent lid. The tail is usually thick and remarkably brittle, and if accidentally lost, is rapidly reproduced. Not infrequently, two, and even three, tails replace the one lost. The Geckos lay round, hard-shelled eggs.

Victoria is represented by six species, none of which occur in the southern districts.

THE MARBLED GECKO (*Phyllodactylus marmoratus*) is the commonest species. It hides during the day under the loose bark of trees, or under logs, coming out at night in search of food, and is very quick in its movements. Usually it is of a greyish colour, variegated with dark-brown markings, which take the form of interrupted, longitudinal, and transverse, wavy lines. The tail is long and swollen, tapering towards the tip, and remarkably brittle. Specimens are commonly found with three, and even four, tails.

Gymnodactylus miliusii is restricted to the warmer parts of the State, where it occurs commonly under bark, logs, and stones. The tail is thick and swollen, and the body and limbs are covered with small, round, conical tubercles. The colour of the upper-surface is chestnut-brown, with several narrow, white, cross-bands on the back and tail, variable in extent. This species, although timid, often takes up its abode in houses, and is commonly seen in the evenings catching flies on the windows.

Diplodactylus vittatus, usually found on the ground under stones, is brown on the back, with a light-coloured, wavy, vertebral band, edged with dark brown.

PYGOPODIDÆ.

THE SCALE-FOOTED LIZARDS, OR SLOW-WORMS, are long, Snake-like reptiles, without fore-limbs, and with the hind-limbs represented externally by small scaly flaps. In the skeleton the hind-limbs show minute toe-bones. The tail is much longer than the body, and very brittle. They travel very quickly with side to side movements, the head being well off the ground. There are five species in Victoria.

THE PYGOPUS, or Common Slow-Worm (*Pygopus lepidopus*) is a perfectly harmless Lizard, but because of its close resemblance to a Snake, it is generally killed on sight. The scaly flaps representing the hind-limbs usually are pressed close to the body, and are not easily discernable. The tail is so brittle that, if seized, it is left in the hand, while the head and body wriggles quickly away to safety. As with most of the Lizards, the tail is replaced by a new one. The colour of this species is extremely variable, greyish, brown or lavender, with several longitudinal rows of black, white-edged spots. Some specimens are of a uniform brownish colour, and practically devoid of markings.

FRASER'S SLOW-WORM (*Delma fraseri*) is of a uniform greyish-brown without markings, or with blackish transverse markings on the head, snout, and sides of neck. It grows to about 15 inches in length. It is common in the Western district, and is often turned up by the plough.

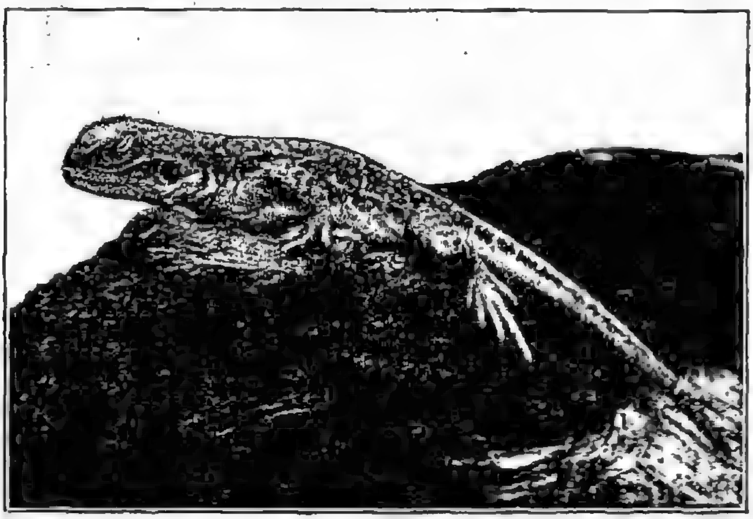
THE STRIPED SLOW-WORM (*Delma impar*) is often found coiled up under stones, and is easily distinguished by the series of oblique, narrow, alternating, light and dark lines on the sides of the tail. Large numbers were turned up by the pick and shovel during the sewerage construction works at Werribee.

THE LITTLE SLOW-WORM (*Aprasia pulchella*) rarely exceeds six to eight inches in length, and may be distinguished by a series of very fine, longitudinal lines on the back and tail.

BURTON'S SLOW-WORM (*Lialis burtoni*) is very variable in colour, grey, brown, reddish or yellowish, and with a variety of markings. The head is longer and more pointed than any other species of this family. It is common in the Mallee district.

AGAMIDÆ—AGAMIDS, OR DRAGON LIZARDS.

This family contains a rather variable group of Lizards, usually with a large head, stout body, and a long, tapering, but not fragile, tail. It includes the so-called "Blood-sucker," so commonly met with at Brighton and Beaumaris; the Jew Lizard, or Bearded Dragon, and many other similar kinds. When alarmed they open their mouths widely, and swell out the body, which gives them a very ferocious appearance, but they rarely bite.



The Painted Dragon.

Photo, C. Barrett.

THE COMMON DRAGON (*Amphibolurus muricatus*) is one of the commonest Lizards met with on the sandy, heath and ti-tree districts around Port Phillip Bay, and has long been known under the popular, but very misleading, name of "Blood-sucker." It is a harmless creature, and may be frequently seen basking in the sun in open places adjacent to cover, or on a fence or fallen log. Its ashy-brown, or dark brown colour, mottled with darker patches, so nearly resembles its immediate surroundings that it is often very difficult to distinguish it. The eggs are usually laid in sandy places under logs or sheets of bark.

THE JEW LIZARD (*Amphibolurus barbatus*) is much larger than the preceding species; and is easily distinguished by the thick, beard-like cluster of long spines fringing the head behind the ears and lower jaw. When alarmed it opens its mouth widely, hisses, inflates its body, and erects its frill, and will bite savagely, but without causing harm. They will live a long time in confinement. The number of eggs laid is said to be from 12 to 14.

THE WHITE-STREAKED EARLESS LIZARD (*Tympanocryptis lineata*) is about five inches in length, and brown in colour, with a series of five longitudinal light lines running down the back. It may be recognised from the young of the Common Dragon by the ear-openings being entirely concealed. It is not uncommon along the banks of the Saltwater River, and on the open basalt plains to the north of Melbourne.

THE WATER LIZARD (*Physignathus lesueurii*) occurs throughout eastern Australia, from Queensland to Victoria. In certain parts of Gippsland, where it is known as the "Gippsland Alligator," it frequents the rivers and creeks, and may occasionally be seen basking in the sun on the rocks bordering the streams. It grows to about three feet in length, and is of a dark-olive colour, with darker and lighter cross-bands, most marked on the tail. The sides of the throat are marked with lines of blue and yellow.

VARANIDÆ—LACE LIZARDS, OR MONITORS.

These Lizards, commonly known as "Iguanas," or "Goannas," are distinguished by the long and deeply-forked tongue, which is furnished at the base with a sheath, into which it can be withdrawn, as in Snakes.

Two species—the Common Lace Lizard, or "Goanna" (*Varanus varius*), and Gould's Monitor (*Varanus gouldii*), occur commonly in Victoria. The former lives usually in trees, but often is found on the ground. It can run with great speed, readily takes to water, and swims well. The food of Monitors consists of birds and their eggs, small mammals, such as young rabbits, and Lizards, etc. As is well-known, these reptiles cause much trouble in poultry yards. A full-grown specimen, measuring six feet in length, was shot on the Murray River, and on being opened, was found to contain three unbroken eggs of the Water Hen. Monitor Lizards lay about a dozen white eggs.

GOULD'S MONITOR (*Varanus gouldii*) is smaller and much lighter-coloured than the Lace Lizard, and when alarmed does not take to trees, but keeps to the ground. It is restricted to the dry north-western part of the State. Some specimens kept in confinement, fed freely on chopped-up meat, and when disturbed, opened their mouths widely and hissed loudly, but rarely attempted to bite.

SCINCIDAE.

This family embraces a number of the smaller species showing great variety of form. Some have four limbs; in others they are quite rudimentary. The toes are variable in number. Some are viviparous. The family includes the well-known Blue-tongued and Stump-tailed Lizards.

THE STUMP-TAILED LIZARD (*Trachysaurus rugosus*) is common throughout the western part of the State. The body is covered with large, thick, rough scales, suggestive of a pine cone. The head and tail are both short and thick, and the limbs very short. It is so very sluggish in its movements, that it has received the name of Sleeping Lizard. The tongue is blackish-purple. They usually give birth to a single young, though I once obtained a specimen in the Wimmera district with two young ones. Although this Lizard is known to feed on small reptiles and insects, it is fond of a vegetable diet, and is said to eat fungus and *Styphelia* berries. I kept one alive for some years feeding it chiefly on finely chopped meat.

BLUE-TONGUED LIZARDS: Three species occur in Victoria. They are smooth-scaled, long-bodied, harmless Lizards, usually found basking in the hot sun in open places, and are easily captured. The method of reproduction is interesting in that while one species is oviparous, another gives birth to 12 or 14 young alive.

When irritated, they appear to expand their bodies with air, which they expel with a sound not unlike the blowing of a bellows.

THE NORTHERN BLUE-TONGUE (*Tiliqua scincoides*) usually met with north of the Divide, though it also occurs in Tasmania, and as far north as Cape York and Darwin. It is the largest species of the genus, growing to a length of nearly two feet, and lays from 12 to 15 eggs.

THE SOUTHERN BLUE-TONGUE (*Tiliqua nigrolutea*) is the species commonly seen in the southern districts. It closely resembles the northern species, but is smaller, and brings forth its young alive. It is found in Tasmania and extends north into New South Wales.

THE BROAD-BANDED BLUE-TONGUE (*Tiliqua occipitalis*) is restricted to the Western District, and may be recognised by the series of broad, dark bands across the body and tail. It is also found in South and Western Australia.

Three species of *Egernia* occur in Victoria, of which the SPINY-TAILED EGERNIA (*Egernia cunninghami*) is the largest, measuring about 13 inches. It is widely spread over the State. The body-scales are keeled, those on the tail being provided with a sharp point. In colour this species is olive-brown, with scattered darker blotches. The young are speckled with light dots, which usually disappear in the adult.

Egernia striolata is a smaller species, usually found in rocky situations. A specimen kept in confinement gave birth to four young ones.

WHITE'S EGERNIA (*Egernia whitii*) is probably the commonest of all the Skinks, and is distributed over the whole of Australia, Tasmania, and adjacent islands. It is prettily marked, with a median line of olive-brown along the back, on each side of which is a broad, black band bearing a series of yellowish-white spots. The eyelids and ear-lobules are yellow. In length it is usually about 10 inches. It frequents all classes of country, but particularly that of a rocky nature, and is very quick in its movements.

There are altogether about 25 species of Skinks in Victoria. The species I have not dealt with are all small, and more than half the number are to be found within 30 miles of Melbourne.

The Orchids of Victoria

BY EDWARD E. PESCOTT, F.L.S., F.R.H.S.

PART VIII.

18. ORTHOCERAS, R.Br.

(Straight horn).

Dorsal sepal erect, incurved, hooded: lateral sepals narrow-linear, long, spreading: petals short, narrow, erect. Labellum recurved, 3-lobed, middle lobe larger, and longer, and contracted at base, a thick fleshy callus at base. Column very short, with lateral erect lobes not connected behind the anther. Anther erect or incurved, tapering to the apex, 2-celled. Pollen masses 2, bilobed, granular or mealy.

Terrestrial glabrous herbs, with an ovoid tuber, a few narrow leaves, which are radical, or nearly so. Flowers distant on short pedicels or pedicels absent.

This genus is limited to a single species, which also occurs in New Zealand, and is recorded there as *O. Solandri*, Lindl.

1. O. STRICTUM, R.Br. (upright). "Horned Orchid."

The plant has all of the characters of the genus as given above. Stem rigid, from 1 to 3 feet in height, having long ovoid tubers. Leaves 3 to 12 inches long, several, near the base, acute, sheathing, channelled. 1 or 2 long stem bracts. Flowers green or greenish brown, distant, erect, up to 8 on short pedicels, each protected by a long incurved sheathing bract, usually longer than the flower itself. Characters of sepals and petals, labellum and column as above; lateral lobes of the column often nearly as long as the petals.

The "Horned Orchid" is often very difficult to locate, as it usually grows among tall grasses and rushes, often in moist springy or clayey soils. Sometimes the stem is almost rigidly erect, especially before the flowers all open. Again the flower portion of the stem will be very curved, perhaps owing to the increasing weight of the flowers and ovaries. As the size of the ovary increases, the flower pushes itself well out from the protection of the long sheath. The two varieties, green and brown, may be found growing together.

The plant is recorded from all districts except the north-east: and also from Queensland, New South Wales, South Australia, Tasmania, and New Zealand. Flowers in early summer, November and December.

19. SPIRANTHES, Richard.

(Coiled flower).

Dorsal sepal and petals erect, concave, petals truncate, all forming a hood over the column. Lateral sepals free, ovate-lanceolate, erect or spreading. Labellum sessile, or nearly so, as long as the sepals, lower half embracing the column, undivided, tip recurved, lamina or disk with 2 rounded globular bodies or tubercles at base. Column erect, short; anther short, blunt, 2 celled. Pollen masses 4, in 2 pairs, granular or mealy. Flowers small, *spirally arranged* in a terminal spike. Terrestrial herbs, with fleshy, elongated underground tubers. Leaves narrow or linear, usually basal.

This is a notable genus, having usually small pink and white flowers, always spirally arranged on the stem. The genus is world-wide, but the species are not common. The single Australian species is recorded also from New Caledonia, New Zealand, tropical and temperate Asia, and also from some parts of Europe.

1. S. AUSTRALIS, Lindl. (Southern) "Austral Lady's Tresses."

The plant has all the characters of the genus; arising from several or many elongated thin tubers, which are not always annually reproduced. Plant from 6 to 24 inches high, leaves 3-4, 3 to 6 inches long, stem bracts 3. Spike spiral, dense or loose, flowers white or pink, or white and pink, sessile. Labellum usually white, as long as the sepals, somewhat rectangular, the tip often reflexed, truncate, margins beautifully fringed or glandular-dentate; base sessile, with an ovoid body or tubercle on each side.

This is a widely spread species, usually growing in marshes, swamps, or on wet stream banks. In colour it resembles *Erythraea australis*, R.Br., the "Austral Centaury"; and as both flower at the same time, the orchid may often be passed by. It often grows among rushes and sedges. The tuberous root system seems to be more or less permanent, new buds and crowns appearing alongside the parent plant, the new crown thus developing its own root system. It flowers in January-February, and is recorded from all districts of the State. It is recorded from all States except Western Australia, and is world wide as above mentioned.

Mr. Oakes Ames places this species as synonymous with, *S. Sinensis*, Ames.

20. CRYPTOSTYLIS, R.Br.

(Hidden Style or Column).

Flowers large, reversed on stem. Sepals and petals free, nearly similar, narrow linear or subulate, thin or membranous. Labellum conspicuously developed, thick, undivided, sessile, base enclosing the column, more or less contracted above the column, extended into a narrow or broad convex or concave lamina. Column exceedingly short, wide, the wings forming distinct auricles or connected into a membrane behind the anther, the margin toothed or fimbriated behind the anther. Anther erect behind the stigma, or bent forward over it, 2 celled, biconvex on the back, sessile, obtuse or shortly acuminate. Pollen masses 4, farinaceous.

Terrestrial glabrous herbs, with tuberous rhizomes, which are not always annually reproduced. Leaves few, radical, ovate to lanceolate, stems with 2 or 3 bracts. Flowers several in a terminal raceme, with usually green petals and sepals, and a large conspicuous, purplish or reddish brown or pink labellum.

The genus is represented in all the States, there being 18 known species. Four of these are Australian, and are all endemic. Two occur in this State. The other 14 come from Formosa, Malay, Papua, Philippines, New Caledonia, Fiji, and Samoa.

1. C. LONGIFOLIA, R.Br. (long-leaved) "Large Tongue-Orchid."

Slender, often tall, up to 2 feet in height; leaves 2 or 3 on rigid petioles, lanceolate, or oblong lanceolate, midrib prominent. Usually 2-3 bracts on stem. Flowers 3 to 8, sessile, reversed, with large conspicuous labellum, the perianth segments usually being light green; buds pointing upwards. Sepals and petals thin membranous, petals shorter, all rolled or folded so as to become subulate (awl-shaped), spreading, inconspicuous. Labellum about 1 inch long, very conspicuous, purplish or reddish purple, rarely purplish brown, nearly ½ inch wide; margins sinuous towards base, which encloses or embraces the column; channelled around the tip, concave towards base, transversed down the centre by two raised somewhat beaded lines, often with two parallel ones, forming a double keel, terminating into a prominent, conspicuous reddish brown or purplish glandular process. There is also a central line approaching the column. The labellum depresses in the centre, and folds inward with age.

the flower slowly depressing and pointing downwards when dying.

This conspicuous species is often found in marshy slopes or heathy valleys, among rushes, sedges and grasses. It prefers a moist location or a moisture-retentive soil. It is often drawn in height, when growing in thick herbage. The long leaves may be mistaken for those of *Lyperanthus suaveolens.* But the leaves of this species are stalked, and often purplish on the back.

The plants flower in mid-summer, usually December to January; it is recorded from all parts of the State. It is also found in Queensland, New South Wales, South Australia and Tasmania.

2. C. LEPTOCHILA, F.v.M. (narrow-lip.) "Small Tongue-Orchid."

A more slender species than the preceding species, upwards of 1 foot in height, flowers smaller, more dense and closer together, 6 to 14; leaf ovate, on short petiole, larger than that of *C. longifolia*, often purplish underneath. Petals and sepals as in that species, but shorter and smaller. Labellum broad at base, clasping the column, pinkish or purplish pink, concave with margins much involute, distinctly *sickle-shaped;* a thick longitudinal raised plate along the centre of the broad base, followed by 2 rows of dark spots, which rarely become calli. Column wing with 2 broad denticulate lobes interrupted behind the anther.

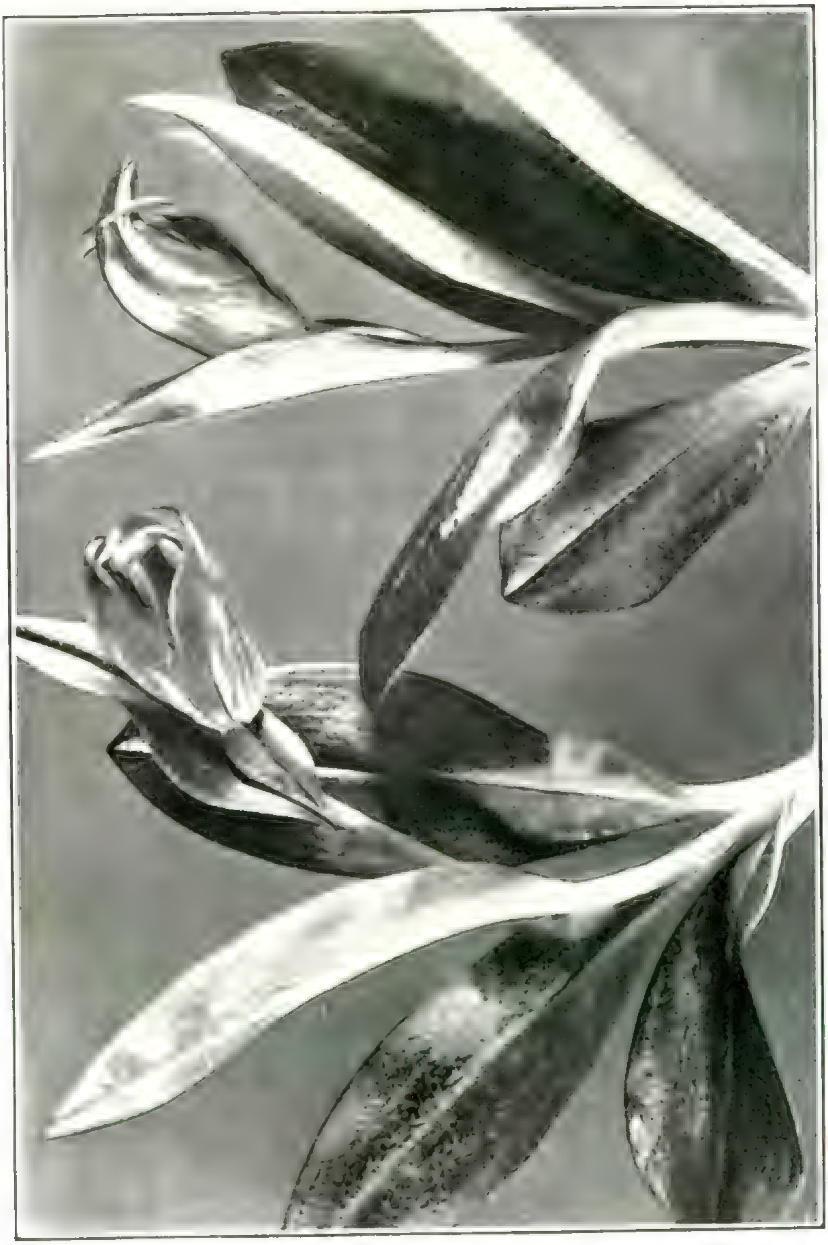
This is a rare species in Victoria, and occurs in the South, chiefly in the Dandenong Ranges, where it was first collected by C. French, Jr., and also from Wilson's Promontory, in the E. It is readily distinguished from the preceding species by the smaller flowers, smaller sickle shaped labellum, and the larger and broader leaves. It flowers at the end of the year, having the same rooting habit as the previous species. Recorded also from New South Wales.

21. PTEROSTYLIS, R.Br.

(Winged style or column).

Dorsal sepal broad, erect, concave or incurved, forming, *united with the petals a hood* or galea over the column. Lateral sepals more or less united in an erect or recurved 2-lobed lower lip, in front of the galea, the lobes or ends frequently terminating in long points. Labellum on a short movable claw or hinge, often irritable, attached to the end of the basal projection of the column; variously shaped, oval, ovate, oblong, linear, THE VICTORIAN NATURALIST Vol. XLIII. *April*, 1927

Plate XX.



PTEROSTYLIS CUCULLATA, R.Br. Leafy Greenhood.

filiform or lanceolate, sometimes having long hairs; bearing at its base an appendage, either very short and obtuse, or longer linear, incurved, and forked or pencillate (hairy) at the end with a tuft of several cilia. Column elongate within the galea, and curved with it, with *a pair of hatchet shaped or quadrangular wings* one on each side of the rostellum and sometimes narrowly winged lower down, the base produced into a short horizontal projection or foot. Anther 2 celled: pollenia 4, powdery or granular free.

Terrestrial herbs, with round, naked, underground tubers, which are replaced annually, frequently increasing in additional numbers at the end of long white roots, or at the end of very short roots adjacent to the parent tubers. Leaves frequently in a radical rosette, sometimes linear and cauline; non-flowering or immature plants usually possessing leaves in a rosette or tuft. Flowers usually green or greenish, tinged or streaked with red or brown, purple or white. Large and solitary, or smaller and several in a raceme on short pedicels.

The genus is chiefly Australian; there are about 56 known species, of which 44 are Australian, most of these being endemic. It extends to New Zealand, New Caledonia and New Guinea. Commonly called "Greenhoods."

The Victorian species may be placed into two classes or sections, as follows:—Section 1: Lower lip erect, the lobes or their points embracing the galea, flowers solitary, or rarely multiple (except No. 21). Nos. 1 to 21. Section 2: Lower lip reflexed from the base against the ovary, lobes acuminate, or long and finely acute, or neither acute nor produced. Nos. 22 to 30.

For a series of line drawings illustrating all the Victorian species, reference may be made to four plates in "Literature" (17), by W. H. Nicholls.

1. P. CONCINNA, R.Br. (neat) "Trim Greenhood." Plant glabrous, slender, from 1 to 4 inches high. Leaves in a basal rosette, no stem leaves. Flower solitary, green with pale bands, and brown points. Galea incurved acuminate, tip acute, not lengthened. Lower lip erect, its lobes having a wide sinus, embracing the galea, very long and finely pointed. Labellum (see illustration) on a projecting claw, oblong, *very distinctly bifid* (notched, or two-fold). Column erect, upper angles of wings very acute.

The "trim" greenhood is quite a feature under the tea-tree along the southern coast, occurring along Port Phillip Bay in colonies of thousands. The nick or notch in the labellum is its very distinguishing feature. Twin flowered specimens are exceedingly rare. This orchid has a wide range in the State, being recorded from all parts except the N.E. It is rather interesting to note that a species which thrives on the sea shore, sprinkled by the sea spray, should also be found in the far N.W.

It also occurs in Queensland, New South Wales, South Australia and Tasmania. Flowering season, winter; June to September.

2. P. TOVEYANA. Ewart and Sharman (after J. R. Tovey, a Victorian botanist). "Mentone Greenhood." Dwarf, under 6 inches in height. Leaves, ovate or ovate elongate, no basal rosette; *about 4 stem leaves clasping*, and one bract immediately below the ovary. Flower longer than No. 1, galea hooded not elongate, dorsal sepal subtended shortly to a fine point; lower lip with wide sinus, the points very long and finely pointed, clasping the galea in an upward direction. Flower green, with pale green stripes. Labellum longer than the column, narrower at top than base, *distinctly bifid,* but not so pronounced as in No. 1.

This rare orchid was first collected by C. French, Senr., in 1887, at "Gypsey Village," the old name for Sandringham. The specimen is in my herbarium. It was then classed with P. reflexa. J. R. Tovey found it for several years at Mentone. It has also been found at Frankston. L. Rodway records it as being fairly common in Tasmania.

Occuring in Victoria, only along the coast at seaside resorts, it is unfortunately likely to become extinct. The stem, leaves and notched tongue are its distinguishing feature. It flowers in June.

3. P. CURTA, R.Br. (shortened, referring to the tips of the lateral sepals). "Blunt Greenhood."

Plant somewhat slender, glabrous, from 4 to 12 inches high. Leaves on long petioles, in a radical rosette, and having 2 loose stem bracts. Flower dull green, solitary, rarely 2-3 (see illustration). Galea large, broad, erect, *quite blunt at the tip.* Lower lip, broad, with wide sinus, short, hardly extending above the galea. *not finely pointed. Labellum, red brown,* linear, obtuse and entire, longer than the column, *twisted and slightly recurved.*

The blunt greenhood possesses somewhat a "squat" character, the large flower, with the broad blunt galea and short lower lip are the chief characteristics. The tubers are annually renewed, with additional "juvenile" ones on long thread-like roots. It occurs in colonies, chiefly in open woodland, and is found in all parts of the State. It is found in all of the States except Western Australia. Flowers from August to October.

4. P. NUTANS, R.Br. (nodding). "Nodding Greenhood."

Plant slender, glabrous, 2 to 18 inches high, tall specimens uncommon. Leaves in basal rosette, oval or ovate, on long petioles, crenulate margins, 3 to 6. Stem bracts 2-3, the upper supporting the ovary. Flower solitary, rarely 2-3 on stem, *very much deflexed or nodding*, green, only slightly streaked. Galea terminating in an acute point, often slightly recurved. Lower lip erect, sinus broad, clasping the galea with narrow points just exceeding the galea. *Labellum* (see illustration) oblong-linear, blunt, *recurved* to almost a semi-circle, *projecting through the lower lip*, dull red, or greenish red, or green with a red brown central line, *pubescent* (*hairy*). Column incurved, wings rounded at upper angles, broad, with a distinct tooth, lower lobes long and falcate, appendage curved, large, pencillate.

The nodding greenhood vies with the "fringed spider orchid," and the "wax-lip orchid" in being our commonest species. It has a distinction of its own, and is much sought for, although so common. It will often be found in grasslands in colonies of thousands. It multiplies very freely by increase of juvenile tubers, one plant often having 3 to 5 new tubers. Its nodding habit is almost unique amongst greenhoods. On one occasion, at Oakleigh, I found a plant with variegated foliage. This reproduced truly for several years.

It is found in all districts, and in all States except Western Australia. Flowers from July to October.

5. P. ACUMINATA, R.Br. "Pointed Greenhood.

Plant rather slender, from 6 to 12 inches high. Leaves in a radical rosette, long ovate, rather narrower than those of No. 4. Stem bracts usually 2, clasping, with one embracing the pedicel and ovary. Flower solitary, larger than No. 4, which it somewhat resembles, except that it is held upright instead of in a nodding position. *Galea erect*, incurved, and produced to a fine point, sloping outwards. Lower lip narrowed, with a somewhat narrow sinus (curve, fold, recess, or angle), points long lanceolate, produced to fine points embracing and passing in length the galea. Labellum hairy, oblong linear, recurved, tapering to a point, produced through the lower lip. Lobes of column broad and obtuse, with a linear point at the front angle.

This is a very rare species, and although recorded from the N.W., S., N.E., and E., the records always refer to single or few specimens. I have only collected one specimen, and that from the Dandenong Range. It resembles *P. nutans,* except for its upright habit. It has a long flowering period, specimens having been collected from autumn to early summer. It is often taken for a hybrid between *P. nutans* and *P. curta,* but it more resembles the former species. Recorded also from New South Wales and Queensland.

6. P. NANA, R.Br. (dwarf). "Dwarf Greenhood."

Plant quite dwarf, from 1 to 4 inches high, slender. Leaves in a radical rosette, small, elliptical, 4-6. One or more stem bracts, clasping. Flower quite small, solitary, *pale green;* stem quite upright. Galea erect, long, pointed at tip. Lower lip erect, long, with wide sinus, points embracing the galea quite long and finely pointed, *a small inflexed tooth in the centre.* Labellum oblong, with a blunt tip, and a central brown line, as long as column. Wings of column with a small upper lobe or tooth; lower lobe oblong and obtuse. Labellum somewhat pubescent, a few hairs also on lower lobes of wings.

This diminutive species is found in all parts of the State, from exposed open situations on sea-cliffs to the far inland tree and grasslands. It is to be found in all classes of country, open and wooded. Its pale yellowish green flowers are easily noticed. It is recorded from all States except Queensland, and flowers from July to October.

7. P. PEDOGLOSSA, Fitz. (Syn. P. PEDALOGLOSSA.) (foot-like tongue or labellum). "Tailed Greenhood."

Plant slender, fragile, dwarf, leaves rosulate (rosette-form), usually 3-5, with an additional one on the stem above the rosette, 2-5 inches high. One stem bract supporting the pedicel. Flower small, pale green, with darker broadish streaks; galea much reflexed in upper half, the dorsal sepal subtending to a *long filiform point,* pointing outwards. Lower lip opening to a wide sinus, with very *long filiform—almost setular* (bristle-like) *points,* embracing the galea and *very far exceeding it.* Labellum short ovate, or rounded ovate, glabrous.

This distinctive greenhood is readily distinguished by its three long thread-like "tails." It usually grows among shrubs, frequently at the base of *Melaleuca squarrosa*, where it occurs in colonies. It is somewhat rare in regard to distribution, but it multiplies freely, and thus numbers are often found growing together. It flowers from March to July, and is recorded only from the South. It is also found in New South Wales and Tasmania.

8. P. PEDUNCULATA, R.Br. (peduncled or stalked). "Maroon Hood."

Plant slender, often tall, from 4 to 12 inches high, tall specimens usually being "drawn" in shade. Leaves ovate in basal rosette 4-6, on long petioles, with 2 or 3 stem bracts. Flower solitary, green, very much flushed with *maroon-brown colourings*. Galea erect, flexed horizontally, with a short acute tip. Lower lip erect, rather broad, with an acute sinus, the very long points embracing and far exceeding the galea. Labellum oblong or ovate, very blunt or obtuse; dark purplish brown, shorter than the column, with raised central line; basal *appendage almost trifid* (three-divided), not hairy. Column erect purplish brown on sides and at top, *upper angle of wings produced into a long sharp point*; lower lobes broad and obtuse, somewhat ciliate on the inturned margin.

Maroon hood is very aptly named. No other "greenhood" is so coloured, and it is therefore easy of determination. It is fairly common, more often being found in bush, or gully country. It is recorded from all parts except the N.W., and also from New South Wales, South Australia, and Tasmania. It flowers from July to October.

9. P. GRACILIS, Nicholls (graceful). "Graceful Greenhood."

The following description, abridged, is taken from the author's published record.

Plant slender, glabrous, from 4 to 12 inches high. *Stem leaves* 2-3, oblong lanceolate, *often large*, petioles slender, margins often crenulate. Stem bracts 3-4, sessile, acuminate, clasping. *Flower small*, solitary, green, apex of galea brownish. Galea erect, gradually incurved, shortly acuminate. Lower lip erect narrow, cuneate, lobes produced into long filiform points, far embracing the galea. Labellum large, oblong-elliptical, projecting, much decurved. Column shorter than labellum, upper lobes of wings toothed, lower lobes narrow, obtuse, with inner margins ciliate.

I have not seen living specimens of this newly published species, which is very distinct, and is well named "graceful." The large leaves and the comparatively small flower are quite distinctive. It might appear to be somewhat like *P. alpina*, or even *P. pedunculata*. But its distinctive labellum and column are outstanding.

There is a specimen of this orchid unnamed in the Melbourne National Herbarium, collected by C. French, Jr., in the Dandenong Ranges over 30 years ago. It is recorded only from the South, and also from several localities in Tasmania, flowering from August to October.

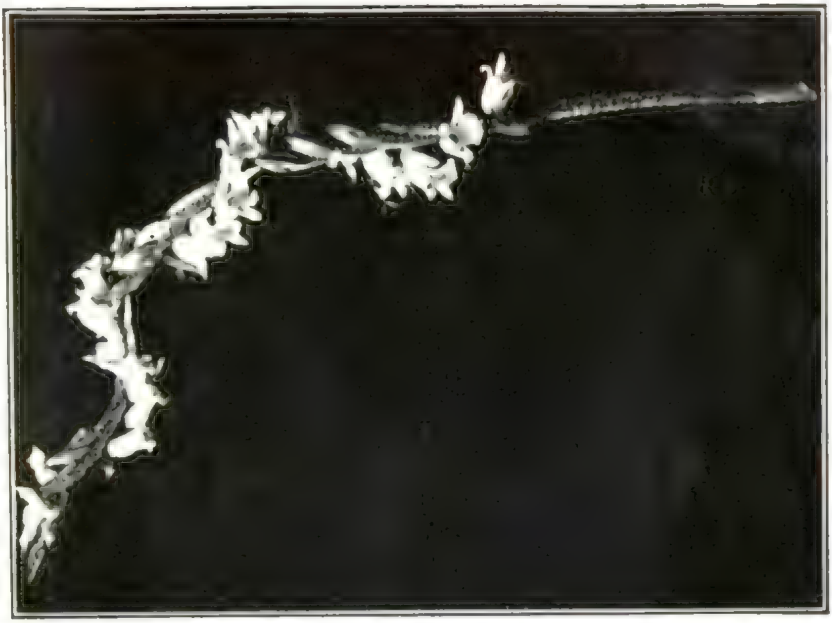
10. P. CUCULLATA, R.Br. (hooded). "Leafy Greenhood."

Plant robust, glabrous, usually stout and *dwarfed*, from 2 to 9 inches high. Leaves crowded at base, almost sessile, large, oblong or obovate, passing into leafy bracts on elongated specimens, the upper one almost enveloping the flower. *Flower quite large*, solitary, generally two shades of green, with chocolate markings on petals and lower lip; somewhat glandular pubescent, iridescent in the sun. Galea large, recurved only at upper portion, somewhat blunt, or with a short decurved tip. Lower lip erect, broad, with wide acute sinus, the broad lobes embracing and curved over the galea, but hardly exceeding it. Labellum long linear or narrow elliptical, channelled, with central raised line, tip blunt, appendage densely pencillate. Column erect, upper margins with short pointed tooth; lower lobe oblong, with broad blunt tip.

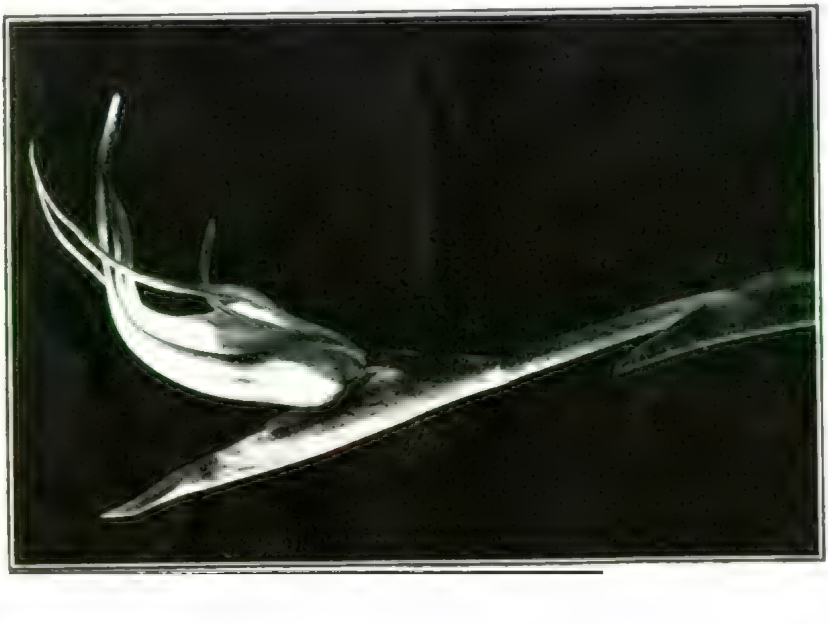
This species is easily distinguished by its somewhat squat, large flower, enveloped in the leafy bract, and is our largest flowered species. It is not common; and was lost to Victorian collectors for thirty years. It is only recorded from the South, from Broadmeadows, Western Port, Point Lonsdale, Dandenong Ranges, and a few other similar localities. During the "lost" period, the orchid now known as *P. falcata* was discovered and confused with *P. cucullata*, being given that name. Then *P. cucullata* was after some years, re-discovered, and named by Baron von Mueller as *P. Mackibbini*. In 1915, Dr. Rogers unravelled the tangled skein, and placed these all in their right position, the last named being placed as a Synonym with *P. cucullata*.

It is also recorded for South Australia and Tasmania, and flowers in September-October.

Plate XXI.



SPIRANTHES AUSTRALIS, Lindl.
Austral Lady's Tresses.



PTEROSTYLIS FALCATA, Rogers.
Sickle Greenhood.

11. P. FALCATA, Rogers (sickle-shaped). "Sickle Orchid."

Plant robust but slender, from 5 to 12 inches high. Basal leaves large, 3 to 5, only rosulate when plant is young. Leaves ovate-lanceolate, sessile. Stem bracts 2 to 3, sheathing, upper one not usually close to ovary, but occasionally so before flower fully opens. Flower solitary, glabrous, very large, sometimes in two shades of green, varying to green and dull purplish. Galea erect, very large, quite sickle-shaped, acuminate, with long outspreading point. Lower lip wide, with wide sinus, produced into very long caudae or tails, embracing the galea, and far exceeding it, often standing erect, and often recurved to sickle-shape. Labellum much longer than the column, curved forward, coming through the sinus broad in centre, and bluntly narrowed at the tip; appendage densely pencillate. Column shorter than labellum, upper lobe toothed, lower lobe roundly obtuse, both lobes ciliated.

This is our second largest species, rare in some places, common in others. On one occasion at the Dandenong Creek, I found colonies of many hundreds, including one albino flower. It is usually found in damp or moist situations. In shade, specimens will be considerably drawn. It is recorded from all parts except the North-West, and also from Tasmania. It flowers from September to January.

ENTOMOLOGISTS' CLUB.

Melbourne entomologists, including several members of the Field Naturalists' Club, have formed a club with the object of popularising their favorite branch of natural history, and encouraging systematic work and the study of life histories. Meetings will be held at members' houses. The Entomologists' Club will be conducted on the lines of the Bird Observers' Club, recently revived, and will not trespass upon our own society's province.

Mr. F. E. Wilson, who presided at the inaugural meeting of the Entomologists' Club, in a brief address, referred to the need for more workers, both collectors and students of insects, in Victoria. "The field," he remarked, "is unlimited; and the toilers in it are few. With the exception of Lepidoptera and Coleoptera, very little systematic collecting has been done in our State, and it is very desirable that we should have enthusiastic collectors in those large Orders, the Diptera, Neuroptera, Hymenoptera, and Hemiptera. One group of insects that is urgently in need of attention is the Aphaniptera. The indigenous species of fleas have as hosts our rapidly vanishing marsupials."

Mr. Wilson mentioned Hemiptera as a greatly neglected Order, of deep interest. In examining mosses, tussocks, and leaf debris, for minute beetles he found many delightful little species of Hemiptera that would otherwise have escaped detection. There was still a great amount of work to be done among the moths; and the study of the life histories of insects of all the Orders offered a vast field of activity for many workers.

FURTHER NOTES ON VICTORIAN CHITONS.

BY EDWIN ASHBY, F.L.S.

Corrections and Additions to the "Locality List of Victorian Chitons," published in the *Victorian Naturalist*, May, 1926.

Ischnoradsia australis evanida, Sowerby: On page 9, 13th line from the bottom, insert the name "*australis*" between *Ischnoradsia* and *evanida*. The form *evanida* can only be considered a subspecies of *australis*. Also, in the "Locality List," insert '*Ischnoradsia australis evanida*, Sow. all coasts," between the genus *Callistochiton* and the subgenus *Heterozona*. This entry was included in the original draft, but through an oversight was omitted.

Ischnochiton iredalei, Dupuis: Through an oversight of the writer's, "*pallens*, Rv." is twice printed in place of "*Ischnochiton pallidus*, Rv." both at bottom of plate I, fig i., and in the 9th line from the bottom, page 15. The writer has discussed with Messrs. J. H. Gatliff and C. J. Gabriel, the advisability or otherwise, of retaining the name of Reeve's *Chiton pallidus* for this shell. On the following grounds we have decided not to accept the name "*pallidus*," but to return to the name *I. iredalei*, Dupuis. The type of Reeve's *pallidus* is worn smooth, the description is consequently ineffective, and the locality is unknown. While I am still of the opinion that Reeve's type is probably a worn example of *I. iredalei*, Dupuis, the accuracy of such an identification can only be determined, if at all, by disarticulation of the type, which may or may not reveal sufficient existing sculpture for determination.

I concur with the gentleman named in rejecting identifications founded upon mere opinions, without the support of adequate data. On these grounds I retract my identification and agree to consider *Chiton pallidus* of Reeve as non-Australian, until such time as additional data may disprove this course. We therefore revive the name *I. iredalei*, Dupuis, which is published in Pt. I. hereof as a synonym only. Iredale and Hull adopted the name *I. lineolatus* for this shell, but it is not the *Chiton lineolatus* of Blainville; for synonymy see Ashby, *Trans. Roy. Soc. S.Aust.*, Vol. xlviii., 1924, p. 329.

Ischnochiton atkinsoni, I. and May: On page 15, substitute "syn" for "var" before the word *lincolnensis*. For explanation see Ashby, *P. and P. Roy. Soc., Tas.*, Feb. 10th, 1927, pp. 111 and 112.

Ischnochiton versicolor, Sowerby. Syn. *I. proteus*, Rv.: On page 15, the 14th line from the bottom, must be altered thus, because, since the publication of my paper, I have, with Messrs. Gatliff and Gabriel, compared Sowerby's figs. (*Mag. Nat. Hist.*, iv., 1840, p. 292, figs. 75 and 122), with examples of *I. proteus*, Rv. We concur with Iredale and Hull in considering them conspecific. On February 17th last I collected this species, in large numbers, at Portland. Some examples measured 40 mm. and more in length; most represented the variety called *milligani*, with closely packed ribs in the lateral areas.

Ischnochiton decussatus, Rv.: On page 15, line 11 from the bottom, *I. decussatus*, Rv., is given as a synonym of *I. contractus*, Rv. In "Notes on the Types of Australian Polyplacophora in the British Museum" (*Trans. Roy. Soc., S.Austr.*, Vol. xlviii., 1924, p. 328), referring to the type of *I. decussatus*, Rv., I say: "This is the shell we used to know under this name in South Australia, but now known under the name *I. contractus*, Rv., this latter was described as having solitary granules in the lateral areas (sic. disjunct), this character is so distinctive that one is compelled to concur with Iredale in considering Reeve's two species as conspecific, *contractus* having page precedence." Thus there is not the slightest doubt that Reeve's *Chiton decussatus* is our shell.

Messrs. Gatliff and Gabriel have pointed out that, in the absence of the type of *contractus*, the mere statement that it has "solitary granules," is not a sufficient ground for its identification with our shell, for the rest of the description is very defective, the figure given by Reeve is not at all like our species in shape, and the habitat is unknown. In conference with these gentlemen, I have agreed to disallow the name *contractus*, considering that it is not an Australian species.

Ischnochiton ptychius, Pilsbry. While, in my previous paper, I queried its identification on a single specimen, Mr. Gabriel has kindly shown me the example of this species referred to, which was collected by the late W. H. Dillon, at Portland, and I now have pleasure in stating that it certainly is *I. ptychius*. On February 17 last, I collected the second known Victorian example at Portland.

Genus *Stenochiton*: On page 15 the prefix "sub" before genus *Stenochiton* should be deleted. I proposed (*Trans. Roy. Soc., S.Aust.*, Vol. xlii., 1918), the elevation of *Stenochiton* to full generic rank on external and internal grounds, but in face of the number of new genera proposed by Iredale and Hull, many of which, in my opinion, are at present unsupported by any true generic definitions, preferred to treat it as a subgenus only, until I had re-examined the grounds given for its elevation. I now confirm my opinion, and consider that the multi-slitting of the insertion plates, common to most species, together with the specialised characters of the shell, justify full generic rank. It would be best placed immediately following the subgenus *Heterozona*.

Callistochiton mawlei, I. and May: Add this species to the Victorian fauna. Mr. Gabriel has shown to me examples in his collection, from Portland, which certainly are referable to this species, hitherto considered peculiarly a Tasmanian form. In further confirmation, I collected four examples of the same rare species at Cape Northumberland, S.A., not far from the Victorian border.

Iredale records odd valves, dredged in 5-20 fms. by Roy Bell, at Port Fairy (*Proc. Lin. Soc., N.S.W.*, Vol. XLIX., pt. 3, p. 214, 1924). Messrs. Gatliff and Gabriel have called my attention to the fact that *C. mawlei* corresponds with Reeve's figures and description of his *C. antiquus*, the name hitherto applied to the Sydney shell, which certainly does not so well correspond with Reeve's figures; I concur with them in this, and am taking steps to settle the question by comparison with the type. In 1922 I compared Reeve's cotypes with *C. meridionalis*, and considered that they were the Sydney shell, owing to the parallel character of the longitudinal sculpture, a feature which equally applies to *C. mawlei*. Both the Sydney shell and *C. meridionalis* show only net-work sculpture in the dorsal area, whereas *C. mawlei* continues the ribbing right over this area. Reeve's figures clearly show this ribbing, and Pilsbry's figures do not. Assuming that the proposed examination confirms this position, the shell now known as *C. mawlei*, Iredale and May, will be *C. antiquus*, Rv., non of Pilsbry auct. Synonym *C. mawlei*, I. and May. The Sydney shell will then require a name, which I suggest be *C. Gatliffi*, in honor of my friend to whom we are chiefly indebted for the correction of this error. The distinguishing characters are described by myself (*Trans. R.Soc., S.Austr.*, Vol. VLIII., p. 400, 1919), that description, with fig. 6, pl. xlii., will then form the type description. In that paper I treated *C. meridionalis* as a subsp. of the Sydney shell, but in a subsequent paper considered them specifically distinct.

Memo.—Iredale and Hull include Victoria under the heading, Habitat, for *Lepidopleurus (Terenochiton) matthewsianus*, Bed., and *Chiton (Rhyssoplax) oruktus*, Maughan, but they supply no data and give no reference. Up to the present, I have not seen a Victorian example of either, neither have I seen a published record. While I am confident that both these will be found in that state, I do not feel at liberty to anticipate the discovery, unless supported by some data.

The following is a list of some of the species collected by me in February last, at the localities named:—

Lepidopleurus badius, H. and H., *L. liratus*, Ad. and Ang., *Acanthochiton granostriatus*, Pils., *A. variabilis*, Ad. and Ang., all at Portland. *A. Kimberi*, Torr, one dry example measures 18 x 7 mm.; in life it was twice the size or more, and the broad girdle beautifully flecked all over in red, Port Fairy; *Ischnochiton decussatus*, C. Rv., non *contractus*, Rv., Portland. *I. virgatus*, Rv., very numerous and fine, at Portland. *I. thomasi*, Bed., Portland. *I. (Heterozona) cariosus*, Pils., Portland. *Ischnoradsia australis evanida*, Sow., very numerous and large, Portland. *Chiton (Rhyssoplax) jugosus*, Gld., Port Fairy and Portland. *C.r. calliozona*, Pils., Portland.

PAST AND PRESENT.

As we grow older we become reminiscent; we try to warn our young friends, out of life's experience. We ask them to preserve many natural beauties, but thinking that supplies are inexhaustible, they do not spare, feeling sure that they can find their treasures, whenever they want them again.

As a lad, my father used to take me to Mt. Macedon, a favourite tourist's resort: we could not travel by train, then from Melbourne to Lilydale, Healesville, Warburton, or Fern Tree Gully. It was at Macedon that I shot my first Koala. There, also, with great pride I brought back to our boarding-house home, my bag of birds, and was read a never-forgotten lesson on my cruelty, by a well-known and kind-hearted fellow tourist, named Crosby. Many years ago I gave up pot-hunting or shooting. Shooting at birds and small animals I try hard to get boys to avoid.

Half-way between the Macedon railway station and Upper Macedon, are the Waterfalls, with a creek once overgrown with, and abounding in ferns of many species. There I received my first lesson, as a boy, from a Field Naturalist, and copied, at his dictation, names that have since given me so much pleasure. I have often wondered who he was, that slight man, who walked to the Camel's Hump with his carpet-bag over his shoulder, collecting ferns. Koalas and ferns have long since disappeared from the creek surroundings. Some time ago, I failed to find one fern on the creek banks.

A little more than 35 years ago, at a picnic, I found the small Rasp Fern in abundance, lining the Dandenong Creek, near Dandenong township. At a more recent date I searched diligently thereabouts, but could not get a specimen. I had not realised that time, or people, had ruthlessly rooted out the ferns. Again, when in my early teens, I used to go shooting to the Tarago, a river towards Neerim, and in the Main Street of Drouin saw, for the first time, the pink young fronds of the Gristle Fern. Since writing my notes on the bipinnate form of the Fishbone Fern, I have learned from Messrs. St. John and C. French, Senr., that this variety of the species was found fairly numerously in the year lang syne. To-day you will find the form only rarely in Victoria.—A.J.T.

NOTES ON NEWTS (CAUDATA).

By H. W. Davey, F.E.S.

(Read before the Field Naturalists' Club of Victoria, March 14, 1927.)

In March, 1913, I received a number of newts, *Molge pyrrhogaster*, from Japan, and in January, 1915, exhibited some of them at a meeting of this Club. To-night I am showing some of the same, living, specimens. None of the newts died while in my possession, but several that were given to friends, at different times, did so shortly after their change of "habitat."

The Northern Hemisphere is the home of the newts and salamanders, 120 species being found there, while in the Southern Hemisphere, only a few species occur; none is found in Australasia. In China and Japan the maximum size of the Caudata is reached; there is found the Giant Salamander *Megalobatrachus maximus*, which grows to a length of five feet. I once saw a very fine living specimen of this gigantic newt, at the Zoological Gardens, at Regents Park, London. These newts feed mostly on fish, which, of course, are swallowed whole. All the Caudata are harmless to man, but several species exude poisonous secretions from glands in their skin.

I have seen one of our large Bell-frogs, *Hyla aurea*, die a few minutes after it had accidently jumped on to the back of a Japanese newt that happened to be out of the water. Fright, probably, caused the newt to exude a fluid that was rapidly fatal to the frog.

Further evidence of the poisonous nature of these secretions was obtained when some examples of the large Warty Newt, *Molge cristatus*, arrived from England. A cat, in an unguarded moment, lifted one of the newts out of the water with its claws, and then severely bit it, for which foolishness it suffered great distress, and was violently sick afterwards.

The Spotted Salamander, *Salamandra maculosa*, attains a length of nine inches, and is a very pretty species. When in perfect condition it is intensely black, and ornamented with large, bright-yellow spots. The colour combination is one of Nature's warnings, this species exuding secretions of a highly poisonous nature. The Japanese newt also has the warning coloration, viz., fiery red.

Newts, under favorable conditions, are extremely long-lived. There is a record of a Giant Salamander having lived in an aquarium for more than 50 years. The newts exhibited to-night I have had in captivity for fourteen years, and it is highly probable that many of them were of a considerable age when they were captured in Japan. It is surprising that not one in my collection appears to be falling into the sere and yellow of life. They feed well; and every spring the males assume the gay coloration so typical of newts in the breeding season. The females also lay fertile eggs each season, which they also as regularly devour, when allowed to do so.

Development of these newts appears to be slower than is that of the European species. The latter reach maturity in three years, usually. I once reared a series of that fine Spanish newt, *Molge waltli;* and, although their growth was very rapid during the first year, they were not mature until three years old.

In a paper read before this Club in January, 1915 (see *Victorian Naturalist,* Vol. 31, p. 137), I mentioned an instance of limb-reproduction that had come under my notice. Two years ago, when I was transferring some of my newts to an aquarium, temporarily, one dropped from a pot of *Valisneria spiralis* on to the ground, without being noticed. On turning round, I trod on it, crushing it so badly that I at first thought it was dead. Three parts of its tail had been completely crushed off, and one side of its head injured considerably. I put it aside, but some time afterwards noticed it moving, so I placed it under a piece of bark near the water; but looking under the bark later, found that it had entered the water. Thinking that, having lost so much of its tail, the newt would be unable to reach the surface for air, I again placed it under the bark, but once more it returned to the water. Its head was in shape, and it appeared to be perfectly well next day, excepting that it had great difficulty in reaching the surface of the water. The stump of the tail soon healed, and gradually a new and perfect tail was developed.

In a letter received from Mr. W. W. Froggatt, F.L.S., Entomologist to the Forest Commission, N.S.W., occurs the following passage:—"I have been collecting gall-making thrips for the last few years, and now have an expert in California, Dudley Moulton, describing the new species for me in our *Linnean Society, N.S.W.* They have some very curious habits. The gravid females of one we obtained from Gildandra, had the abdomen swollen like that of a queen white ant (Termite), and was the sole mother to a gall containing a thousand active larvae."—C.D.

EXCURSION TO ELTHAM.

About 25 members and friends took part in the excursion to Eltham on February 19th. The weather was unfavorable—dull and windy, with showers; but we had a pleasant ramble to the banks of the Yarra. Several Eucalypts, hosts to clumps of mistletoe, *Loranthus pendulus*, were stripped of bark in the search for pupae of the Mistletoe Blue, *Ogyris olane;* but only one pupa was discovered. The larva of this Lycaenid is one of the few *blues* that are not attended by ants. On the foliage of an acacia, gregarious larvae of the Imperial Blue, *Ialmenus evagoroas*, were found; also pupae. Small black ants were swarming over them.

Among butterflies captured were *Heteronympha merope*, *H. philerope*, *Xenica klugi*, and *Zizina labradus*. Sixteen species of birds were noted, Mr. Hanks making the list.—C. H. BORCH.

EXCURSION TO KILLARA.

A richly fossiliferous outcrop of Silurian mudstone, on Mr. J. H. Syme's property at Killara, Upper Yarra, was visited on February 26th by about 24 members and friends. At Killara railway station we were met by Mr. T. C. Bowie, manager of the estate.

On the short walk to our destination, Mr. Bowie pointed out an excavation in ironstone which, so far as he knew, was the only occurrence of such a rock in the district. A little investigation with eyes and hammers soon showed evidence of drifted wood embedded in the rock. Although a careful search was made for any casts of marine fossils, none was found. Altogether, the appearance of the material suggests a lagoon accumulation, perhaps not far from the sea. The rock, moreover, is very similar to another ironstone, which I recently found near Cave Hill, Lilydale, and which may be associated with the older basalt. Mr. Bowie did not know of any basaltic occurrence in the district, but extensive denudation may have accounted for its absence here. On looking up the original series of fossil specimens collected by the Victorian Geological Survey, in the fifties of last century, and now in the National Museum, I found a specimen of fossil wood, from an ironstone bed at Woori Yallock (B 23), close by, which I had determined by a microscopic examination, some years ago, as probably coniferous.

We soon arrived at our destination, where the mudstone, belonging to the newer division of the Silurian (Yeringian), is seen in a drive put into a rising bank. Among the fragments of rock thrown out, we commenced to search, and soon collecting bags contained many specimens—trilobites, lamp-shells, corals, and snails of a long departed sea fauna. Among the corals were found the rugose, simple form, *Lindstroemia*, and the epizoic, tabulate *Pleurodictyum*, which had a habit of fastening itself, in an annoying way, to the stem of a sea-lily. Remains of sea-lilies were abundant, but only the stems were represented. Their articulated joints show a wonderful radial pattern, and sometimes the central gut was seen as a stick-like cast projecting from the middle of the plate. In one case a coiled arm of a probable *Herpetocrinus* was found.

Of lamp-shells there was practically no end to the number of kinds. Those identified were:—*Atrypa reticularis*, *Camarotoechia* spp., *Chonetes* sp. nov., *Cyrtina* sp., *Leptaena rhomboidalis*, *Nucleospira australis*, *Orthis testudinaria*, *Spirifer lilydalensis*, *Stropheodonta lilydalensis*, and *Strophonella euglyphoides*. Bivalved shells were fairly common, and more than usually interesting. Thus there was the elegant *Palaeoneilo raricostae*, with its striking taxodont or toothed hinge-line, the curiously angulated *Goniophora australis*, a fragment of the large pearl-mussel-like *Leioptera*, and the buttressed *Cucullella*.

The sea-snails included the slit-band snail, *Pleurotomaria maccoyi*, and the remarkable air-breathing snail, *Hercynella*, which has been described at some length by the leader in *Proc. Roy. Soc., Vict.*, Vol. XXIX., 1917, pp. 123-126. A fine specimen of *Hercynella victoriae* was found by one of the members at this excursion. Among others of the gasteropods, quite an interesting series of sea-butterflies were found, such as a fine specimen of *Comularia*, a *Tentaculites*, with its small needle-shaped and transversely ribbed shell, *Hyolithes*, which generally carries a lid to the orifice, and the worm-like *Coleolus*, common to Australia and North America. Among the cephalopods were noted, *Kionoceras*, *Cycloceras* and *Orthoceras*.

The trilobites, perhaps, excited the most interest. Numerous head-shields of *Phacops*, and several compound eyes of the same form were discovered. This genus has about 200 to 300 facets on each eye. The allied genus *Dalmanites*, was represented by one or two fine tail-pieces or pygidia. Other kinds of trilobites found were *Cheirurus*, *Calymene*, which could roll itself up like a woodlouse, a head of *Cyphaspis*, probably *C. lilydalensis*, and por*tions of the spinose Acidaspis*. Other crustaceans represented were numerous little water-fleas, or ostracods, *Beyrichia wooriyallockensis*, and a species of a eurypterid or sea-scorpion. The ostracod, which here occurred in myriads, is also interesting from the fact that the leader named it in 1902, from specimens, now in the Museum, obtained a stone's throw from this place. Not the least interesting finds were some woody fragments in these Silurian rocks, taking us back to the very beginning of the land plant-flora.

Our thanks must be accorded to Mr. Bowie for providing the party with hot water and afternoon tea and giving us the facilities for commemorating our visit to the spot by the planting of a *Tristania* by the leader. The idea originated with our Vice-President, Mr. P. R. H. St. John, who brought the tree from the Botanic Gardens. We are also indebted to Mr. H. R. Syme, who, however, was unable to be present, to act as co-leader. The locality is beautifully situated on the rich lands at the junction of the River Yarra with the Woori Yallock Creek; and with the uplands of the Steele Range opposite, there could be no more enjoyable surroundings.—F. CHAPMAN.

NOTES from FIELD and STUDY

SWIFTS AT WARBURTON.

Early one morning in January last, a very large number of Swifts, *Hirundapus caudacutus*, was observed, congregated round the summit of Ben Cairn. My companions and I agreed that there must have been at least 1,000 of these graceful birds soaring and wheeling round the summit of the mountain and out over the valley. Was the gathering a preliminary to the long migratory journey northwards? Insect life apparently was abundant, and many of the birds were plunging at intervals into the bushy ends of branches of some tall Eucalypts. Hovering, the birds would capture insects and launch into space again.

There were many good vantage places for perching, and we were quite satisfied that, on at least two occasions, two birds did perch for a brief period. While I was watching a dead gum tree, possibly 50 yards distant, a Swift flew to the topmost branch, which was nearly horizontal, hesitated, and then alighted, holding its wings quite still and almost folded. It remained thus for about a second, certainly not with the object of getting an insect, as its head did not move. The second bird to perch was seen by five members of our party. It flew to the end of a leafy branch and alighted, clinging, wings stationary, in a half sideways position, for about two seconds. Though only two birds alighted, dozens threw themselves on to the branch tips, wings hovering, as they snapped up insects.

Sitting on the rocks, it was delightful to watch the aerial evolutions of such a vast number of birds. Once or twice, so thickly did they gather, they resembled nothing so much as a great swarm of bees on the wing. Some were seen to hover, motionless, excepting the wings, for a time, but most of them were constantly sweeping round the summit and out over the valleys. Loud whirring, rushing sounds were heard, as they swept past at tremendous speed. This lasted from 8 a.m. until about 8.30 a.m. The notes of a few birds were rather pleasing, calling to mind the sweet, restrained song of the Welcome Swallow.—C. H. BORCH.

GROWTH IN *LYGODIUM*.

"Climbing maiden-hair" ferns are, perhaps, rare in cultivation, yet they are very charming plants, and, once established, grow luxuriantly. My first attempt to add *Lygodium scandens*, Sw., to my fern community, failed: the young plant, received from a New South Wales botanist, familiar with *Lygodium* in its haunts, soon perished. A successor has survived, though one of its two tender shoots withered, and the other lost its unfurling bud.

About a fortnight after the "accident," a new bud, no bigger than a pin-head, and "furry," appeared in an axillary position, and was examined daily. This mode of regeneration, as it were, was interesting. The bud developed into a vigorous shoot, and now, a month later, my *Lygodium* is proving that its specific name is well deserved: the little fern is climbing steadily; and next year may rival in beauty its neighbours, true maiden-hair ferns, including *Adiantum formosum.*

Professor F. O. Bower, in his great work on "The Ferns," has a chapter on the morphological analysis of the shoot system of these fascinating plants, and refers to *Lygodium* and other genera with which we are familiar. He states: that the *axillary position* of buds is not uncommon, and it is found in some of the most archaic types. Among living ferns, it is best seen in the Hymenophyllaceae, and has been shown also to occur in the Ophioglossaceae. (*The Ferns* (Filicales), I., p. 70).

Interest in Victorian ferns has been stimulated by Mr. H. B. Williamson's excellent series of papers in the *Naturalist.* Those who, like myself, have long delighted in the grace and beauty of ferns, while lacking botanical knowledge, are able now to identfy many species, and have learned more than their names. I hope that Mr. Williamson will contribute soon, illustrated articles on our water plants—they are not less interesting than the Filicales.—C.B.

KANGAROO FIGURES ON COINS.

English tradesmen's tokens of the seventeenth and eighteenth centuries are interesting to the naturalist as well as to the coin collector, and numismatist. At least, some of them are, because animals figure in the designs. A "Zoo" series might be selected from the hundreds of pieces that were issued by traders and tavern-keepers to make up the deficiency in supplies of small change, in the course of two centuries.

A token in my collection, has on the obverse figures of a kangaroo, an armadillo, and a rhinoceros. It was issued in 1795, by T. Hall, City Road, London, who describes himself, in an inscription on the token, as "The first artist in Europe for Preserving Birds, Beasts, etc." The portrait of our national mammal on this old English token is, apparently, copied from a figure in one of the early "Voyages"; it is quaint; for the animal is rather like a large rat, sitting half erect on its hind legs, with the head turned towards a tail, which is tilted as a blue wren holds its tail usually. Much closer to nature is the figure of a kangaroo on the famous Tasmanian shilling, issued by Macintosh and Degraves in 1823.

Again, on the Tasmanian shilling of 1825, our marsupial appears. This is an exceedingly rare coin; one was sold recently, in London, for £25, Mr. A. Chitty, the noted Melbourne numismatist, informs me, in sending some notes regarding "kangaroo" coins. On the obverse of all the Port Phillip gold pieces a kangaroo is shown facing to the right below the date, 1853. These pieces, also, are great rarities.

Many other early Australian pieces bear kangaroo's portrait; while, of course, it figures with the emu on our current coinage, in the coat of arms.—C.B.